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THE

LONDON DISPENSATORY,

CONTAINING

I. THE ELEMENTS OF PHARMACY.

II. THE BOTANICAL DESCRIPTION, NATURAL HISTORY, CHEMICAL ANALYSIS, AND MEDICINAL PROPERTIES, OF THE SUBSTANCES OF THE MATERIA MEDICA.

III. THE PHARMACEUTICAL PREPARATIONS AND COMPOSITIONS OF THE PHARMACOPŒIAS OF THE LONDON, EDINBURGH, AND DUBLIN COLLEGES OF PHYSICIANS.

THE WHOLE FORMING

A PRACTICAL SYNOPSIS

OF

MATERIA MEDICA, PHARMACY, AND THERAPEUTICS:

ILLUSTRATED WITH

MANY USEFUL TABLES,

AND

COPPER-PLATES OF PHARMACEUTICAL APPARATUS.

7/.

William Parker
Presented by W. Day Junr.

BY ANTHONY TODD THOMSON, F.L.S.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS
AND OF THE MEDICO-CHIRURGICAL SOCIETY OF LONDON:
FELLOW OF THE MEDICAL, THE SPECULATIVE, AND THE ROYAL
PHYSICAL SOCIETIES OF EDINBURGH,
AND OF THE SOCIÉTÉ DE MÉDECINE DE MARSEILLE.

SECOND EDITION.

LONDON:
PRINTED FOR LONGMAN, HURST, REES, ORME, AND BROWN,
PATERNOSTER-ROW.
1818.

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TO

SIR JAMES MACGREGOR, KNT. M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS
OF EDINBURGH;
PHYSICIAN EXTRAORDINARY TO HIS ROYAL HIGHNESS
THE PRINCE REGENT;
AND
DIRECTOR GENERAL OF THE ARMY MEDICAL DEPARTMENT,
&c. &c. &c.:

AS
A TESTIMONY
OF RESPECT AND ADMIRATION,
FOR
HIS ARDUOUS AND WELL DIRECTED EFFORTS,
TO PROMOTE
THE CULTIVATION OF GENERAL SCIENCE
IN
THE PUBLIC DEPARTMENT UNDER HIS CONTROL;
AND, CONSEQUENTLY,
TO ELEVATE THE GENERAL CHARACTER
OF THE MEDICAL PROFESSION,

THIS VOLUME IS INSCRIBED,
BY
HIS FRIEND,
THE AUTHOR.

ADVERTISEMENT.

THE progressive advancement of Chemical Science and many new discoveries in Natural History, have contributed, within the space of a very few years, to alter materially the character of Pharmacy; and consequently to give to this Edition of the Dispensatory the aspect, almost, of a new work. These circumstances, and the Author's desire to make the volume as complete as possible, have occasioned the delay of its publication much beyond the time he expected; but he trusts not without the enhancement of its value.

In noticing a few of the alterations, he would observe, that the botanical characters of the BONPLANDIA TRIFOLIATA are now given[1]: and that he has adopted the opinion of Mr. Colebrooke, that Olibanum is the production of the BOSWELLIA SERRATA; and, also, his statement that the greater part of the Camphor brought to Europe is obtained from the DRYOBALANOPS CAMPHORA.[1] Dr. Berry's description of the male plant of that species of BRYONIA which yields the Calumba Root, he has introduced from a conviction of its accuracy; and has taken every advantage of the excellent paper of Mr. Marshall[2], to enlarge the history of the article CINNAMON; and of Dr. Rehman's Memoir[3] to render more complete the account of RHUBARB.

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[1] The second Volume of the *Plantæ Æquinoctiales*, from which this has been translated, had not appeared when the First Edition of the Dispensatory was published.

In the Chemical Department the alterations are necessarily numerous; and in consulting the more recent publications, both general and periodical, which have appeared on this part of his subject, on the continent and in this country, he trusts he has overlooked nothing of importance. He has endeavoured to improve, by a series of original experiments, the method of detecting arsenic, when it has been administered in food as a poison; and has also given the result of his investigations on the analysis of opium, according to the excellent methods of Serturner and Robiquet.

The alterations in the names of many of the articles of the Materia Medica, and also of the Preparations in the recent edition of the Edinburgh Pharmacopœia, have been carefully transcribed. On this point the author would venture to remark, that from the approximation of the terms now employed in that work to the nomenclature of the London Pharmacopœia, as well as the adoption of several of its Preparations, there is some reason for anticipating the formation of a National Pharmacopœia at no very distant period; an event which would materially tend to improve the art of Pharmacy, and to advance the entire Practice of Medicine.

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[1] *Asiatic Researches*, 4to. vol. xii.

[2] *Philosophical Transactions*, 1817.

[3] *Mem. de la Societé Imperiale des Nat. de Moscow*, 1809, t. ii.

The Author has only farther to add, that he has subjoined to the name of each article used abroad, its synonymes in the French, the German, the Italian, and the Spanish tongues; and also in those languages that are more generally spoken by the Asiatic inhabitants of our possessions on the Indian peninsula[1]; an addition which he hopes will render his work not only more interesting, but more extensively useful.

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[1] The information on this part of his subject, the author has obtained from the *Materia Medica of Hindoostan*, of his friend WHITELAW AINSLIE, M.D., *superintending surgeon of the Madras establishment;* a work which is scarcely known in this country, although it is one of no ordinary merit, and of great importance to our Oriental dominions.

Explanation of the abbreviations employed in the synonymes:

(*F.*) French.
(*G.*) German.
(*I.*) Italian.
(*S.*) Spanish.
(*H.*) Hindoostanie.
(*San.*) Sanscrit.
(*Tam.*) Tamool.
(*A.*) Arabic.
(*Pers.*) Persian.
(*Beng.*) Bengalese.
(*Duk.*) Dukhanie.

CORRIGENDA.

Page 3. line 23. for ‘ is,’ read *are.*
8. —— 12. — ‘ spoonsful,’ read *spoonful.*
12. —— 18. — ‘ singe,’ read *single.*
8. —— 28. — ‘ Sofarico,’ read *Solforico.*
13. —— 46. — ‘ tesselated,’ read *tessellated.*
21. —— *in nota* — ‘ Αγοη,’ read **Αλοη.**
23. —— *in nota* — ‘ *Αγθαια,*’ read **Αλθαια.**
26. —— 7. — ‘ fʒij,’ read f℥ij.
31. —— 21. — ‘ leaflets,’ read *leafets.*
34. —— 10. — ‘ (*Taru,*)’ read (*Tam.*)
46. —— 17. — ‘ Floreset,’ read *Flores et.*
47. —— 16. — ‘ eonvulsive,’ read *convulsive.*
48. —— 36. after the word ‘ Arsenico,’ insert (*S.*)
51. —— 40. for ‘ enchymoses,’ read *ecchymosis.*
85. —— 16. — ‘ Pfiffer,’ read *Pfeffer.*
96. —— 11. — ‘ Kardo benedictenkract,’ read *Kardo benedictenkraut.*
96. —— 11. — ‘ Curdo,’ read *Cardo.*
192. —— 25. — ‘ Ellebro,’ read *Elleboro.*
207. —— 49. — ‘ *Hyosciami,*’ read HYOSCIAMI.
238. —— 3. *of note,* for ‘ follis,’ read *foliis.*
239. —— 16. for ‘ factis,’ read *flachs.*
255. —— 11. — ‘ Ofeffermunze,’ read *Pfeffermunze.*
265. —— 31. — ‘ Quinquica,’ read *Quinquina.*
277. —— 36. — ‘ Marjolaine,’ read *Marjoraine.*
286. —— 30. — ‘ bc,’ read *be.*
328. —— 18. — ‘ leqno,’ read *legno.*
386. —— 14. — ‘ BENZOINI,’ read OFFICINALIS.
387. —— 19. — ‘ OFFICINALIS,’ read BENZOINI.

PREFACE

TO THE FIRST EDITION.

THE unnecessary multiplication of books on the same subject may be said, with propriety, to be a great evil: and, therefore, in undertaking the compilation of the following Work. which in its arrangement and plan coincides very closely with the Edinburgh New Dispensatory, it has been my endeavour to render it essentially so different from that work, as to prevent it from being placed under this reproach. But the plan of that volume which is nearly the same as was originally adopted by Dr. Lewis, with some little alterations, has become so familiar to the profession, and is so well adapted for the purposes of a Dispensatory, that I have thought it prudent not to deviate from it. I trust, however, that the alterations and the additions which I have introduced, particularly in the history of the different articles of the Materia Medica, will give a legitimate value to the London Dispensatory; and, without a wish to detract from the high character of its precursor, will enable it to excite a new interest in the branch of the science of medicine of which it treats; and especially to turn the attention of the student towards Medical Botany, which has been so unaccountably neglected, as to be almost regarded as unnecessary in the education of a physician. Indeed, although it has always been admitted that a correct knowledge of Materia Medica and Pharmacy can be obtained by those only who have a previous knowledge of Botany and Chemistry, yet neither the Dispensatories nor the systems of Materia Medica published in this country, have described plants in a scientific manner; or noticed, in their descriptions, those characteristics which botanists have fixed on as the only means by which a plant, that is not familiar to the reader of a description of it, can with certainty be known, when he wishes to possess it, or is in any doubt regarding it when it is obtained. From the want of this degree of accuracy in the descriptions of plants, many valuable remedies used by the inhabitants of one part of the world have been lost to those of another part, where they are, nevertheless, indigenous; or, instead of the proper plants, other species of the same genera, which possess little or no virtue, have been employed; and even plants, not in any respect medicinal but highly deleterious, have been used as remedies, merely from their bearing names in common or in pharmaceutical language similar to those of some medicinal plants. To prevent this evil, therefore, I have added to the usual account of each vegetable substance the characters of the genus to which the plant belongs, as they are given by Willdenow in his excellent edition of the *Species Plantarum;* and have also given detailed descriptions of each in the language employed by modern botanical writers.

In the performance of the task of compilation, I have endeavoured to bring together as much useful information, regarding each of the substances treated of, as could be crowded into a small space; and to obtain it, have had recourse to every work of reputation to which I could gain access. For the liberality of Sir Joseph Banks, who, through the kind interference of Dr. Garthshore, opened to me the door of his princely collection, I have to return my most grateful thanks; as I obtained information there which I could not otherwise have procured, and some which has never before, I believe, been given to the public in an English garb. Of this nature, in particular, are the observations of Zea on the medicinal species of Cinchona, extracted from the *Anales de Historia Natural;* those of Humboldt on the same subject, and on some other South American plants, from his splendid work entitled *Plantæ Æquinoctiales;* and Willdenow's description of the Heracleum gummiferum, which I have translated from the *Hortus Berolinensis.* Information has also been sought for, and obtained, from other sources besides books; and I have received from individuals engaged in the drug trade some notices regarding the forms in which drugs are imported, and the modes of selecting them; which I hope will prove useful.

The botanical descriptions of the plants have been selected chiefly from *Martyn's edition of Miller's Gardener's Dictionary;* the last edition of *Woodville's Medical Botany;* *Smith's Flora Britannica; Sowerby's English Botany;* the *Flora Peruviana; Rheede's Hortus Malabaricus;* and the *Flora Danica:* but in every instance when the living plants could be obtained, — which was the case with the greater number of the indigenous plants, and many exotics also, — the descriptions have been either drawn up from nature; or those adopted have been carefully compared with the plants themselves, and any errors corrected. For other information on this part of the subject, the excellent work of *Gærtner de Fructibus; Bergius' Materia Medica a Regno Vegetabili; Murray's Apparatus Medicaminum; Alston's Materia Medica;* and the *Linnean,* and the *Philosophical Transactions,* with the best books of travels, have been consulted.

For the chemical part I have principally consulted the last editions of the *System of Chemistry of Doctor Thomson,* and that of my very ingenious friend *Mr.* (now Dr.) *Murray;* the *Annales de Chimie; the Journal de Physique;* the *Philosophical Transactions;* and the best chemical papers inserted in the periodical publications: nor have I refrained from taking advantage of the observations of Dr. Duncan contained in the *Edinburgh New Dispensatory.*[1] As this is undoubtedly the most important part of the work, I have given it all the attention I am possessed of; and although it would be almost impossible, and altogether unnecessary, to prove by actual experiment the correctness of all the formulæ for the preparations and compositions ordered in the Pharmacopœias, yet the greater part of those ordered in the London Pharmacopœia, which I have chosen for my text-book, have been repeated, and an unrestrained opinion regarding them delivered. Those chemical theories only, however, which are fully established have been adopted; and I have studiously avoided ranking myself on either side, on the important questions now at issue, suggested by the late investigations of Mr. (now Sir H.) Davy.[1]

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[1] The following are the more important of the additional works, which have been conſulted for the present edition.

Flore du Dictionaire des Sciences Médicales, decrite par F. P. Chaumeton, Chamberet et Poiret, 8vo. Paris.

Histoire Nat. et Med. des Cases, &c.: L. T. Calloden de Geneve, M.D. 4to. Montpelier, 1816.

Materia Medica of Hindostan, &c. &c. By Whitelaw Ainslie, M.D. 4to. Madras, 1813.

With regard to the reformed nomenclature of the Pharmacopœias, the entire principle of which has been strongly objected to by Dr. Bostock, in his *Remarks on the Nomenclature of the London Pharmacopœia*, I conceive it to be my duty to state here, that although I have not scrupled freely to criticize such names as appear to me to be improper in the work

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A Treatise on the Medicinal Leech, &c. &c. By T. Johnson, M.D. 8vo. London.
Mem. de la Société Imperiale des Nat. de Moscow, 4to. Moscow, 1809.
Asiatic Researches, 4to. Calcutta.
Tableaux Chimiques du Règne Animal, &c. *par* Jean-Frédéric John, &c., *traduit de l'Allemand*, par Stéphane Robinet, 4to. Paris, 1818.
Annales de Chimie et de Physiques, 8vo. Paris.
Henry's Elements of Experimental Chemistry, 7th edit. 8vo. London.
Elementi di Chimica Farmaceutica e d'Istoria Naturale, &c. 8vo. Torino.
Nouveaux Elémens de Therapeutique et de Matiere Médicale, &c. *Par* I. L. Alibert, 8vo. 4me edit. Paris, 1817.
Farmacopea Generale ossia Dizionario delle Preparazioni Farmaceutico-Mediche, &c. di L. V. Brugnatelli, 8vo. Pavia, 1814.
Traite des Poisons, &c. &c. par M. P. Orfila, 8vo. Paris.
Philips' Remarks on the Editio Altera of the Pharm. Lond. 8vo. London.
Journal de Pharmacie et des Sciences Accessoires, &c. 8vo. Paris.
Journal of Science and the Arts, 8vo. London.
The Annals of Philosophy, 8vo. London.
Medico-Chirurgical Transactions, 8vo. London.
The London Medical Repository, 8vo. London.
Bancroft's Philosophy of Permanent Colours, 2d edit. 8vo. London.

[1] One of the most interesting of these questions regards the constitution of muriatic and oxymuriatic acids. Mr. Davy has advanced the opinion that the former is a compound of the latter with hydrogen, and that the latter is a simple substance, an acidifying principle resembling oxygen; and capable of forming with inflammable substances and metals an extensive series of analogous compounds. Mr. Murray has combated this opinion, and brought forward some strong facts in support of the old doctrine, that oxymuriatic acid is a compound of oxygen and muriatic acid: but the question still remains *sub judice.*

of the London College, and incompatible with the views of the subject which it professes to have taken; yet, that I do not concur with that gentleman in thinking that the reform was unnecessary, or now, when it is accomplished, that it is not likely to be generally adopted. It is, indeed, deeply to be lamented, that a work, issuing from so respectable and learned a body as the London College is acknowledged to be, is not more perfect in its execution: but, nevertheless, its nomenclature is much superior to that of its predecessor; and within the scope of my own observation, as well as from information which I have received from others, it is now coming into very general use. Many of the older physicians already write their prescriptions in the reformed language; and it is so congenial with the habits of thinking, and the ordinary language and mode of writing of the younger practitioners, that there is no doubt of its being readily adopted by them.[1]

The best authors have been consulted regarding the medicinal properties and uses of the various substances treated of; but I must confess that less attention has been given to this, as it is not intended that the practice of medicine should be taught by a Dispensatory; and surely little is to be expected from those who would attempt to acquire it from such a source. As memorandums, however, I have been anxious to make the medical notices as correct as possible; and have, in most instances, given references to the works from which the best information on this part of the subject may be obtained.

After all my efforts, however, to avoid errors, I am sensible that the work may, nevertheless, contain many; I have, therefore, determined to lend a willing ear to the remarks of candid criticism; and, in future editions, to take advantage of every suggestion that may tend to bring it nearer to that state of perfection, the attainment of which must afford more satisfaction to an author than all the indiscriminate praise which can be lavished upon his labours. I might, indeed, plead as an apology for its imperfections, that the work has not been prepared in the repose of retirement, and with an abundance of leisure; but, on the contrary, that I have been able to bestow on it the few leisure hours only which I could snatch from full employment in a laborious branch of the profession, and during the wasting of the midnight oil, amidst inconvenience and anxieties; and with the perpetual annoyance of professional interruptions. I am sensible, however, of the futility of such an apology; and as the book is now in the hands of the profession, it must fall or rise according to its merits: I can only hope these will be justly appreciated by the Public, that tribunal, by which every production, whether of intellect or of labour, must be ultimately judged.

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[1] The experience of five years have fully confirmed these anticipations.

ANTHONY TODD THOMSON.

91, *Sloane Street,*
April, 1811.

As *analysis* separates compounds into their constituent principles, so *synthesis* may reproduce them by recombining these principles; and when this can be effected, it is the surest proof of the accuracy of any analysis. In many instances, however, this is impossible; and the evidence of the truth of an analysis is to be drawn from other sources.

It is an acknowledged law of chemical affinity, that a compound "does not possess properties merely intermediate between those of its component parts, but has acquired others more or less new." One of the most general changes is that of form. The combination of two gases, for example, may produce a fluid or a solid; that of two fluids may form a solid; and the common process of *solution* presents to us the fact, that by the combination of a solid with a fluid, the solid assumes the fluid form. In the last-mentioned instance the fluid is generally regarded as the active substance; but, nevertheless, the attraction of affinity is reciprocal; and hence, the general mode of expressing the fact, that the fluid dissolves the solid, or is the solvent or menstruum, is, in strict language, erroneous. These terms, however, are more correctly applied, when the properties of the solid, except in form, are scarcely sensibly altered; as, for example, when common salt, muriate of soda, is dissolved in water.

Chemical combination produces an alteration of *density*—that of the compound not being the mean of the components, but often different. In the greater number of cases the density is increased; owing probably to a mutual penetration of the components, as there is a diminution of volume; and hence the specific gravity of a compound cannot be determined by calculation from the specific gravity of its ingredients. There are cases of combination, however, in which the density is diminished: and there is an increase of volume in the resulting compound: for instance, when a solid is dissolved by a liquid, the increase of volume acquired by the solid in passing into the fluid state may be greater than the condensation resulting from its union in that state with the liquid; and this happens from the solution of a considerable number of the salts in water.

"The exertion of chemical attraction is accompanied by a *change of temperature*." Thus, if four parts of sulphuric acid and one part of water, both at the temperature of 32°, be mixed together, the temperature of the mixture rises to 300°; and the density of the compound is much greater than the mean of the densities of the components. The heat also which is evolved by combustion, and in fermentation, is the direct consequence of chemical combination. In all cases the increase of temperature is accompanied with an increase of density, to which, and the change of form suffered by one or both of the components, its production may be ascribed. Thus steam condensed to water parts with a large portion of caloric; and the same effect is produced when water is solidified by being mixed with quicklime. The contrary effect, however, or an absorption of caloric, is also produced by chemical combination, when the density of the compound is less than the mean; as, for instance, when, by solutions of salts in water, or in some other fluids, very intense colds, greater than any natural cold, are artificially produced.[1]

The exertion of chemical affinity is influenced by various circumstances: these, according to Berthollet, are mass, cohesion, insolubility, specific gravity, elasticity, and inflorescence.

1. That *mass* has a considerable share in influencing chemical affinity was first suggested by Berthollet, who states it as a canon, that combinations do not depend altogether on the attraction of affinity, but on the proportions also, of the substances brought into action. Thus, if A and B form a compound, and C be a substance which has a stronger affinity for A than B has, it should be able when mixed with the compound to withdraw A altogether from B, if combination was regulated by affinity only: but this he affirms is not the case in fact; for C does not entirely combine with A, but is shared between it and B, according to the force of the affinity, and the bulk of each. This view of the subject affords a reason why, in pharmaceutical compositions, a small quantity of a substance may be added to a compound, without producing any sensible effect, although, if added in large quantity, decomposition would directly ensue. It follows, also, from it, 1st. that "the chemical action of one substance on another, must diminish as it advances to saturation:" and, 2dly, that a decomposing substance "must oppose a stronger resistance to the decomposing agent, in proportion as the decomposition proceeds, from the increase in the relative quantity of one of its ingredients to the other, which is abstracted:" and, lastly, "that in estimating the relative forces of affinity in bodies, the quantities of them must be taken into account, and ought to be equal." Objections have been advanced to the opinions of Berthollet on this subject, yet, as the opposing theories are not fully established, it is unnecessary to enter into an examination of the objections at the present moment.

2. *Cohesion* has an evident influence in opposing chemical action, and counteracting the exertion of chemical affinity. Thus all aggregates are more slowly acted on by liquids in

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[1] See Appendix to Part I. No. I.

which they are soluble, than when their parts are mechanically divided; and this does not happen altogether from the mere circumstance of a larger surface being presented to the fluid; for native oxide of tin, which in the aggregate resists completely the action of any acid, becomes soluble when its aggregation is overcome by mechanical operations; and some other substances are similarly affected. Hence *trituration*, *levigation*, and *granulation* are ranked among pharmaceutical operations, and are of importance "in facilitating chemical action, partly by diminishing aggregation, and partly by increasing the surface on which affinity is exerted." In some instances mechanical division is not sufficient, and recourse must be had to precipitation. Thus liquid potash will not dissolve silica in powder, as it can be obtained by trituration; but when the silica is precipitated from a state of chemical solution, it is readily dissolved in liquid potash.

Owing to the force of cohesion, also, solid bodies seldom act chemically on solids; while fluids readily combine with fluids, and likewise act with energy on solids for which they have an affinity. Fluidity, however, is not indispensable to chemical action; there being many cases in which two solids, in a state of minute mechanical division, act chemically on each other.[1] (See *Section* iii.) When, however, the specific gravities of even two fluids are very materially different, their chemical combination is opposed, to a certain extent, by the force of cohesion of the heavier fluid; and hence, *agitation* is frequently necessary for aiding the operation of affinity.

Cohesion has sometimes a considerable influence in determining the proportion of combinations formed in consequence of new affinities. Thus, if its intensity be sufficient to counterbalance the affinity of the fluid in which the integrant particles resulting from a new combination are formed, it will combine these, and produce crystallizations or precipitations, which, withdrawing the substance thus formed in part from the sphere of action, and opposing a resistance to any further exertion of chemical power, will consequently determine the proportions of the combination.

3. *Insolubility* must necesarily modify chemical action. If an insoluble compound substance be acted on by any substance tending to combine with one of its principles, this is protected in some degree by the insolubility of the compound withdrawing it from the action of the decomposing substance; and if a compound which is produced in the progress of combination be insoluble, it will be directly precipitated, and thus

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[1] Thence the axiom *Corpora non agunt nisi sint soluta*, which was formerly established in chemistry, is not generally true.

fixed in its proportions. In decomposition this is extremely useful; for the insoluble product, being immediately separated, cannot oppose the further action of the decomposing substance, which would be the case were it to remain in solution.

4. *Specific gravity* influences considerably the exertion of affinity, particularly if the substance be of little solubility, by withdrawing it from the sphere of action, and hence retarding its combinations; and in many instances this can be but imperfectly counteracted by agitation.

5. Chemical attraction, as far as the aëriform substances are concerned, is opposed by *elasticity.* Thus, when two gases, having mutual affinities, are mixed together, they very seldom combine, which is ascribed to the distances between the particles of substances existing in the gaseous state: for, as chemical attraction is exerted at insensible distances only, the particles of the two gases, although mingled together, are yet without the sphere of attraction. That this is owing to elasticity, is evident from the circumstance that the vapours which are not elastic more readily combine. Hence, whatever gives density to highly elastic substances, as for example, mechanical pressure, or cold to a certain degree, must favour their chemical combination.

6. *Efflorescence* may also influence chemical affinity; a fact which was first observed by Scheele, who ascertained, that if in a paste composed of several saline substances decomposition is going on, one of the resulting compounds often rises through the mass, and forms an efflorescence on its surface; and its being thus withdrawn from the sphere of action contributes towards forwarding the decomposition.

7. The influence of *temperature* in modifying chemical action is very considerable. An increased temperature, by promoting fusion, and in other respects weakening the attraction of cohesion in solids, favours combination; but opposes it in some cases, as much as it augments elasticity. In both instances its effects are much modified by the degree of its intensity; combinations effected at a lower, being often dissolved at a higher temperature, owing to one or more of the components having its affinity weakened by an increased elasticity. Thus, mercury exposed to air for some time at a temperature equal to its boiling point, combines with the oxygen of the air, and is converted into red oxide of mercury; but if the fire be raised so as to make the retort red hot, this oxide is again decomposed, and running mercury and oxygen gas obtained.

From the influence of the above circumstances on chemical combination, the utility of these pharmaceutical and chemical operations, which diminish aggregation, overcome the effect of specific gravity, diminish elasticity, and regulate temperature, such as pulverization, trituration, granulation, agitation, and compression, with the proper management of furnaces, is sufficiently obvious.

In that department of pharmacy, also, which regards extemporaneous compositions, it is of importance to attend to the slowness with which chemical action is in many instances produced; for substances, which have mutual affinities for each other, may give no indication of any change when newly mixed, but yet, after some time, may act, and produce even complete changes.

Chemical attraction may be exerted between more than two bodies, so as to bring three or four into one combination; and such compounds are named *ternary*, *quaternary*, *&c.* according to the number of their components. Several examples of these are to be found among the saline preparations (*Part* iii.); and almost all the vegetable substances are compounds of three or more principles.

The forces with which chemical attraction is exerted are different in different bodies. In cases where this attraction is exerted in a superior degree by a third body to either of the components of a compound of two bodies, so as to decompose it, and form a new compound, while at the same time one of the components of the previous compound is set free, the affinity thus exerted has been termed *single elective attraction.* To represent the relative forces of affinity, tables were first constructed by Geoffroy; and afterwards much improved and extended by other chemists, particularly Bergman: but the opinions of Berthollet on this subject have tended very much to lessen their value, although their utility to a certain extent must undoubtedly be acknowledged.[1] When the elective attractions are more complicated, or when two elective affinities are exerted, and two new compounds formed, this is termed *double elective attraction.* In such cases, Mr. Kirwan denominated the attractions which tend to preserve a compound in its original state *quiescent*; while the others which tend to separate the principles of a compound from each other, he termed *divellent attractions.* As an example of double elective attraction, let it be supposed that two compounds, one consisting of potash and sulphuric acid, or *sulphate of potash*, and the other consisting of muriatic acid and lime, or *muriate of lime*, be mixed together, a double decomposition will take place, and two new compounds, *sulphate of lime*, and *muriate of potash* will be formed. In this case, if the attraction between potash and sulphuric acid be 62, and that between lime and muriatic acid be 20, the sum of the quiescent attractions will be 82; but if the attraction between potash and muriatic acid be 32, and that between sulphuric acid and lime be 54, the sum of the divellent attractions will be 86: which, exceeding the former sum of the quiescent, will operate and produce the above-stated decompositions and resulting compounds.[1]

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[1] See Appendix to Part I. No. II.

According to the opinions of Bergman, the relative force of the affinities which produce these effects is capable of being measured, and the changes are altogether to be ascribed to the predominance of the affinities of one set of substances over another. But a different and more correct view of the subject has been given by Berthollet, of which we shall now give an outline.

The changes produced by the predominance of certain affinities over others, according to the theory of Bergman, are ascribed by Berthollet to those circumstances which influence attraction, and limit combination. If four substances, for example, be presented to each other, two of which have a greater tendency to cohesion than the other two, so as to form by their union an insoluble compound, instead of one compound being formed by the union of the four, in which the affinities are balanced, this will be averted by the force of cohesion, and the two which form the insoluble compound will unite, and be separated by precipitation or crystallization, leaving the other two in combination in the fluid which has been the medium of action. "If even these four substances were previously in the reverse binary combinations, on presenting them to each other, the affinities within the sphere of action must be reciprocally exerted; and the same extraneous forces will cause an exchange of principles, or the phœnomena which have been ascribed to elective affinities will be produced." To avoid the term elective attraction, Berthollet denominates cases of this kind *complex affinity*. The explanation of single elective attraction, or where three substances are presented to each other, is pre-

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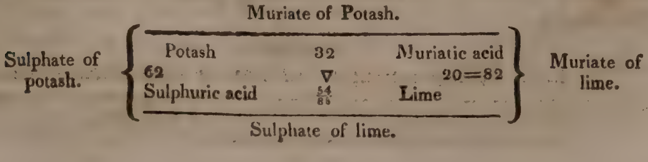
[1] To represent this effect of double elective affinity more clearly, diagrams are used, the idea of which first occurred to Dr. Cullen. Thus the above operations would be represented in the following manner: The inverted triangle in the centre denotes water, or that the decomposition was effected in the humid way.



cisely the same; the union which takes place between two of them being determined by the tendency to cohesion, or the disposition of the combination of two of them to form a compound of little solubility.

Elasticity likewise has a considerable influence in determining decompositions where the application of heat is necessary; and, according to Berthollet, the decomposition of a compound body, of which one of the ingredients has a great tendency to assume the elastic form, is to be ascribed to the disposition it has to escape from its combination, when aided by the intervention of even a weaker affinity.

In complex affinities the same cause determines the union of substances disposed to assume the elastic form, and separates them as a volatile compound. "If, therefore," says he, "it be desired to know the result of the exposure of two salts to the action of heat, it is only necessary to consider which of the two bases, and which of the two acids have the greater volatility, if there be a difference: for the more volatile base and acid will escape and enter into combination, and the fixed base and fixed acid will remain behind, and combine with one another."[1] Tables representing the forces of affinity have been constructed; but, as Dr. Henry has justly remarked, "one great obstacle to the construction of such tables, is the difficulty of ascertaining, with precision, the quantities of bodies required for neutralization."[2]

A knowledge of the doctrines of affinity is of the utmost importance in pharmacy; and, as the foregoing sketch presents little more than an outline, I must refer those who would wish to investigate the subject to Thomson's and Murray's Systems of Chemistry, Bergman's Dissertation on Elective Attraction, and Berthollet's Researches into the Laws of Chemical Affinity.

II. REPULSION.

REPULSION is that force which separates the particles of bodies from each other, and consequently counteracts or modifies the attractions by which they are combined and preserved together in masses. It is supposed to depend on the operation of one or more of the three following powers; *Caloric*, *Light*, *Electricity*.

a. CALORIC.

The cause of the sensation of heat is denominated *caloric*.

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[1] *Researches*, p. 3. quoted by Murray, *System of Chemistry*, i. 120.

[2] Henry's *Elements of Experimental Chemistry*, 7th ed. vol. i. p. 57.

Philosophers are not completely agreed whether it is a property only of bodies, such as a vibration of their particles[1], or a peculiar substance; but the latter opinion is the one more generally adopted.

Under this opinion caloric is regarded as a very subtile elastic fluid, which penetrates more or less all bodies, passing readily from one to another; and is every where diffused. Its particles are supposed mutually to repel each other; and bodies into which it enters in any sensible quantity are increased in bulk, and undergo other changes of form. It is radiated in the same manner as light, and in this state forms a part of the solar ray.[2] The rays are refrangible, and capable of reflection. It has no ascertainable gravity; and neither the addition nor the abstraction of it alters sensibly the weight of bodies.[3] It exists in two different states; in a free state, in which it is merely loosely mingled as it were, with other bodies; and, in a latent state, or one of intimate combination.

Regarding it as matter, the sources whence it may be obtained, the laws which regulate its motion and distribution, and its effects, require to be noticed.

Sources of Caloric.

The known sources of caloric are the *sun*, *combustion*, *percussion*, *friction*, and *mixture*.

a. The *sun* is an apparent source of caloric; but, the direct action of the sun's rays upon bodies seldom produces a temperature exceeding 120°. When these, however, are concentrated by means of a concave mirror, or a lens; or when means are taken to prevent the communicated heat from being carried off by the surrounding bodies, a much higher temperature can be produced. This source of caloric is not resorted to for pharmaceutical purposes.

b. *Combustion* is a source of caloric highly interesting on account of its utility.

When a combustible is heated to a certain degree, it is consumed, emitting rapidly light and caloric, until the whole substance has suffered a change of properties.

The true nature of this process was first explained by Lavoisier, who laid it down as a chemical axiom, that "in every case of combustion, oxygen combines with the burning body." His explanation of combustion depends on two laws: 1st. That when a cumbustible body is heated to a certain temperature it immediately begins to attract and combine with the oxygen of the atmospheric air. 2d. This oxygen being in a state of gas, and combined with light and caloric, is decomposed during its union with the combustible, and its caloric and light are set free in a sensible form; while the oxygen itself remains combined with the combustible. The truth of this theory is generally supposed to be proved by the facts, that combustion does not go on unless oxygen be present: and it is more brilliant in oxygen gas than in common air. The products of combustion are always heavier than the body consumed; and this increase of weight is exactly equal to the quantity of oxygen which the air loses. Every combination of oxygen, however, with bodies does not produce the phænomena of combustion. Brugnatelli has endeavoured to explain this by supposing that oxygen combines with bodies in two states: "1. retaining the greater part of the caloric and light with which it is combined when in the state of gas; and, 2. after having let go all the caloric and light with which it was combined."

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[1] The idea of caloric being motion or vibration, originated with Lord Bacon.

[2] *Philosophical Trans.* 1807.

[3] Ib. 1799, p. 179.

The above theory of combustion is however liable to some objections; for instance, the emission of caloric and light is not proportional to the quantity of oxygen that combines with the combustible: and the quantity of light that appears depends altogether upon the combustible. Under the supposition, therefore, that the caloric is obtained from the oxygen of the substances supporting combustion, while the light is derived from the combustibles, the process has been regarded as a case of "double decomposition; the oxygen and combustible dividing themselves into two portions, which combine in pairs; the one compound is the *product*," or the combustible base united with oxygen, "the other is the *fire*," or the caloric and light, "which escapes."[1]

The caloric set free by the burning or combustion of coal, charcoal, carbonated hydrogen gas, oil, wax, and tallow, is applied to the purposes of life, and is of the first importance in the practice of pharmacy: thence endeavours have been made to ascertain the quantity of caloric evolved during the burning of different combustibles, and several experiments have been instituted by the most able chemists at different times for this purpose. The following table exhibits the quantity of caloric evolved by the combustion of different substances, the estimate being formed from the quantity of ice melted during the burning of one pound of each of the substances.[2]

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[1] *Thomson's Chemistry*, 4th edit. i. 607.

[2] *Thomson's Chemistry*, i. 610.

Substances burnt, 1 lb.	Oxygen consumed in lbs.	Ice melted in lbs.		
		Lavoisier.	Crawford.	Dalton.
Hydrogen	6	295	480	320
Carburetted hydrogen	4			85
Olefiant gas	3·5			88
Carbonic oxide	0·58			25
Oil	3·5	148	89	104
Wax	3·5	133	97	104
Tallow	3·5			104
Oil of turpentine				60
Alcohol				58
Æther	3·			62
Phosphorus	1·5	100		60
Charcoal	2·8	96·5	69	40
Sulphur	1·36			20
Camphor				70
Caoutchouc				42

From this table it appears that hydrogen gas would form the best fuel, where a high temperature is required.

c. Percussion, as far as it applies to solid bodies, is another source of caloric. Smiths, for instance, are in the habit of kindling their fires by means of an iron rod, which is smartly and quickly hammered until it becomes red-hot; and sparks are produced by the collision of hard bodies, particularly of flint with steel. This effect appears to arise from condensation, or forcing the integrant particles of the bodies closer together, so as to dislodge the latent caloric they contain, and give it out in the form of sensible caloric. The specific gravity of iron is increased ·052 by being hammered; and it becomes so hard and brittle that it cannot again be heated by percussion, until it has been exposed for some time to a red heat in the forge. By the collision of flint and steel the oxidizement of the steel is also effected, the sparks being small incandescent pieces of oxidized iron.

d. Friction is also a source of caloric. It is a well known fact, that a considerable quantity of free caloric is disengaged when two substances are smartly rubbed together; but the real source of the caloric thus evolved, still remains unknown.

e. Finally, *mixture*, or the chemical union of two substances, in many cases evolves caloric. This always takes place when the density or specific gravity of the mixture is greater than the mean of the substances mixed; as in the mixture of alcohol and water, or of sulphuric acid and water; and much caloric is also evolved when water is thrown upon quicklime, owing to the solidification of the water when it unites with the lime. The caloric which is evolved in these, and other instances of mixture, is the latent caloric, which is the cause of the fluidity of the components; for as the compound is less fluid, and consequently requires the presence of a smaller quantity of combined caloric, the superabundance which the more fluid components contained must be necessarily set free.

Such are the sources from which caloric is obtained: combustion is the most important of these; and the knowledge of the laws by which it is regulated, and the modes of conducting it, is of the first consequence in the practice of pharmacy. (See *Furnaces.*)

Distribution and Effects of free Caloric.

From whatever source caloric is obtained, it passes from bodies in which it is accumulated in a free state into bodies which contain less of it, until both are brought to an equilibrium. "The state of a body, with regard to its power of producing the different effects arising from the presence of caloric, is termed its *temperature*:" and this depends on the quantity of sensible caloric contained in it. Thus, when a vessel containing water is placed on the fire, a quantity of caloric passing from the fire into the water, its temperature is raised, or it is made sensibly hotter; and if the water thus heated be taken from the fire and placed in a cold place, the sensible caloric accumulated in it, passes from it into the air and surrounding bodies, until it becomes as cold as they are, or its temperature be lowered to an equilibrium with theirs. The caloric which passes from hot bodies during their cooling is carried off; 1st, by the conducting power of the surrounding medium, which "diminishes as the temperature of the hot body approaches to that of the medium;" 2dly, by radiation; 3dly, by currents, or the repeated change of the portion of medium immediately in contact with the hot body; produced by the change of density occasioned by the caloric it receives from the hot body enabling it to rise and give place to a new portion, which, being heated, is also displaced in its turn, and so on till the temperature of the hot body approaches to that of the medium. By accelerating these changes the rate of cooling is proportionably quickened; and hence the cooling effect of winds, and artificial currents of air.

The temperatures of bodies can be comparatively ascertained to a certain extent by the sensations they induce. Thus, a body containing much sensible caloric feels warm or hot to the touch, owing to its caloric flowing into the hand; and one containing less gives the sensation of cold, owing to the abstraction of caloric from the hand. But this mode of judging of temperature is very limited, and depends on the state of the sentient organ, and many other external circumstances, which prevent confidence from being placed on it as a comparative measure of temperature: and therefore instruments have been invented to measure the degrees of temperature of different bodies; the properties of which depend on the *expansion* or increase of bulk which bodies suffer when caloric enters into them.

The thermometer is a most useful and important instrument of this kind. It is a hollow glass tube, having at one end a hollow globe or bulb; the hollow of the tube being perfectly cylindrical, and of a small bore, and the bulb of a proportional size. The bulb, and a portion of the tube, after the air is expelled, by holding the bulb over the flame of a lamp, are filled with mercury or coloured alcohol, by immersing the open end of the tube in either of these fluids, and the tube is then hermetically sealed at the extremity.[1] When the bulb of this instrument is applied to a hot body, the mercury, or the fluid it contains, rises in the tube, and continues to do so until the thermometer acquire the same degree of temperature as the hot body, when the mercury becomes stationary, and the point to which it rises indicates the temperature of the hot body. In the same manner when the bulb is applied to a cold body, the mercury contracts and falls in the tube. The quantity which it thus rises or falls, indicating the proportion of increase or diminution of temperature, is ascertained by a scale which divides the tube into a number of equal parts or degrees.

For ordinary purposes, mercury is the liquid best adapted for thermometers; its expansion being most equable; but alcohol is used when great degrees of cold are to be measured.

The thermometer commonly employed in this country is that of Fahrenheit[2]: but as three other thermometers are used on the continent, it may be proper to notice all of them, and point out the circumstances in which their scales differ.

Fahrenheit, in forming his thermometer, began the scale at the temperature produced by a mixture of snow and sea salt acting on each other; and divided the space between this and the point indicated by the temperature of boiling water into 212 equal parts or degrees; 212° being marked as the boiling point. The part of the scale indicated by the freezing of water, he found to be 32 degrees from its beginning; therefore 32° is marked as the freezing point: and the space between which and the boiling point is equal to 180°. The scale may be extended above this point and also below its commencement, the degrees downwards being marked inversely with the same numbers as the ascending scale.

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[1] Thermometers of great accuracy may be purchased; but those who may wish to construct them for themselves, will find ample instructions for their guidance, in the third chapter of *Henry's Elements of Experimental Chemistry*.

[2] Fahrenheit was a German artist.

The scale of the thermometer of Celsius, which has been used in France since the revolution, begins at the freezing point of water, which is consequently marked 0, and the space between that and the boiling point is divided into 100 equal degrees; hence it has been named the *Centigrade Thermometer.* Each degree of this scale is $\frac{4}{9}$ths more than a degree of Fahrenheit's, or one of the latter is equal to $\frac{5}{9}$ths of a degree of the centigrade scale. To find, therefore, the degrees of Fahrenheit's scale, corresponding to those of the centrigade, the given number of the latter must be multiplied by 9, and divided by 5, adding 32 to the quotient: the sum expresses the degree on ths scale of Fahrenheit.

Reaumur's thermometer, which is still used in Italy and Spain, also commences at the freezing point, which is marked 0; and between this and the boiling point it is divided into 80 degree. Each degree is therefore $\frac{5}{9}$ths more than one of Fahrenheit's; and to reduce those of Reaumur to Fahrenheit's, the given number of the former must be multiplied by 9, and divided by 4, adding 32 to the quotient.[1]

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[1] *TABLE showing the degrees of Reaumur's and Fahrenheit's thermometers corresponding with those of the centrigrade thermometer.*

Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.
100	80·	212·	68	54·4	154·4	36	28·8	96·8	5	4·	41.
99	79·2	210·2	67	53·6	152·6	35	28·	95·	4	3·2	39·2
98	78·4	208·4	66	52·8	150·8	34	27·2	93·2	3	2·4	37·4
97	77·6	206·6	65	52·	149·	33	26·4	91·4	2	1·6	35·6
96	76·8	204·8	64	51·2	147·2	32	25·6	89·6	1	0·8	33·8
95	76·	203·	63	50·4	145·4	31	24·8	87·8	0	0·	32·
94	75·2	201·2	62	49·6	143·6	30	24·	86·	1	0·8	30·2
93	74·4	199·4	61	48·8	141·8	29	23·2	84·2	2	1·6	28·4
92	73·6	197·6	60	48.	140·	28	22·4	82·4	3	2·4	26·6
91	72·8	195·8	59	47·2	138·2	27	21·6	80·6	4	3·2	24·8
90	72·	194·	58	46·4	136·4	26	20·8	78·8	5	4·	23·
89	71·2	192·2	57	45·6	134·6	25	20·	77·	6	4·8	21·2
88	70·4	190·4	56	44·8	132·8	24	19·2	75.2	7	5·6	19·4
87	69·6	188·6	55	44.	131·	23	18·4	73·4	8	6·4	17·6
86	68·8	186·8	54	43·2	129·2	22	17.6	71·6	9	7·2	15·8
85	68·	185·	53	42·4	127·4	21	16·8	69·8	10	8·	14·
84	67·2	183·2	52	41·6	125·6	20	16.	68·	11	8·8	12·2
83	66·4	181·4	51	40·8	123·8	19	15·2	66·2	12	9·6	10·4
82	65·6	179·6	50	40·	122·	18	14·4	64·4	13	10·4	8·6
81	64·8	177·8	49	39·2	120·2	17	13·6	62·6	14	11·2	6·8
80	64·	176·	48	38·4	118·4	16	12·8	60·8	15	12·	5·
79	63·2	174·2	47	37·6	116·6	15	12·	59·	16	12·8	3·2
78	62·4	172·4	46	36·8	114·8	14	11·2	57·2	17	13·6	1·4
77	61·6	170·6	45	36·	113·	13	10·4	55·4	18	14·4	0·4
76	60·8	168·8	44	35·2	111·2	12	9·6	53·6	19	15·2	2·2
75	60·	167·	43	34·4	109·4	11	8·8	51·8	20	16·	4·
74	59·2	165·2	42	33·6	107·6	10	8·	50·	21	16·8	5·8
73	58·4	163·4	41	32·8	105·8	9	7·2	48·2	22	17·6	7·6
72	57·6	161·6	40	32·	104·	8	6·4	46·4	23	18·4	9·4
71	56·8	159·8	39	31·2	102·2	7	5·6	44·6	24	19·2	11·2
70	56·	158·	38	30·4	100·4	6	4.8	42·8	25	20·	13·
69	55·2	156·2	37	29·6	98·6						

In De Lisle's thermometer, which is used only in Russia, the space between the boiling and freezing points is divided into 150 degrees; the gradation beginning at the boiling point, which is marked 0; and increasing inversely to the freezing point, which is marked 150°. It is seldom mentioned by authors.

These instruments are well adapted for determining the variations of temperature which bodies undergo; but a certain degree of fallacy attends the observations made by them, which is chiefly owing to the expansion of mercury increasing with the temperature. Thus, the medium degree of heat between the freezing and boiling points, although marked on the scale 122°, yet, is actually 118·8° 1′ only; the temperature which is equal to raise the mercury in the tube 86 degrees in the first

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TABLE exhibiting the degrees of the centrigade and Fahrenheit's thermometers corresponding to those of Reaumur's thermometer.

Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.
80	100·	212·	46	57·5	135·5	12	15·	59·
79	98.75	209·75	45	56·25	133·25	11	13·75	56·75
78	97·5	207·5	44	55·	131·	10	12·5	54·5
77	96·25	205·25	43	53·75	128·75	9	11·25	52·25
76	95·	203·	42	52·5	126·5	8	10·	50·
75	93·75	200·75	41	51·25	124·25	7	8 75	47·75
74	92·5	198·5	40	50·	122·	6	7·5	45·5
73	91·25	196·25	39	48·75	119·75	5	6·25	43·25
72	90·	194·	38	47·5	117·5	4	5·	41·
71	88·75	191·75	37	46·25	115.25	3	3·75	38·75
70	87·5	189·5	36	45·	113·	2	2·5	36·5
69	86·25	187·25	35	43·75	110·75	1	1·25	34·25
68	85·	185·	34	42·5	108·5	0	0	32·
67	83·75	182·75	33	41.25	106·25	1	1·25	29·75
66	82·5	180 5	32	40·	104·	2	2·5	27·5
65	81·25	178·25	31	38·75	101·75	3	3·75	25·25
64	80·	176.	30	37·5	99·5	4	5·5	23·
63	78·75	173 75	29	36·25	97·25	5	6·25	20·75
62	77·5	171·5	28	35·	95·	6	7·5	18·5
61	76·25	169·25	27	33·75	92·75	7	8·75	16·25
60	75·	167·	26	32·5	90·5	8	10.	14·
59	73‘75	164·75	25	31·25	88·25	9	11·25	11·75
58	72·5	162·5	24	30·	86·	10	12·5	9·5
57	71·25	160·25	23	28·75	83·75	11	13·75	7·25
56	70·	158·	22	27·5	81·5	12	15·	5·
55	68·75	155·75	21	26·25	79·25	13	16·25	2·75
54	67·5	153·5	20	25·	77·	14	17·5	0·5
53	66·25	151·25	19	23·75	74·75	15	18·75	1·75
52	65·	149·	18	22·5	72·5	16	20·	4·
51	63·75	146·75	17	21·25	70·25	17	21·25	6·25
50	62·5	144·5	16	20·	68·	18	22·5	8·5
49	61·25	142·25	15	18·75	65·75	19	23·75	10:75
48	60·	140·	14	17·5	63·5	20	25.	13·
47	58.75	137·75	13	16·25	61·25			

instance, being sufficient, by increased expansion, to raise it 94 in the second.[1]

Expansion, or increase of bulk, is the most general effect of caloric, and, with very few exceptions, may be regarded as a general law of its operation.

When caloric flows into a body, it separates its integrant particles from each other, and hence augments its volume. This change is smallest in solids, more considerable in liquids, and most considerable in gaseous bodies; or the expansibility is greater in the inverse ratio of the force of aggregation. Thus, the expansion of air is 8 times greater than that of water; and the expansion of this 45 times greater than that of iron.

The expansion of solid bodies is, in general, so very inconsiderable as not to be easily ascertained by measurement; but, as far as it can be known, it is nearly equable. The degree of expansion, however, is not the same in all solids; thus, for example, the metals expand in the following order, commencing with the least expansible; platina, antimony, iron, bismuth, copper, tin, lead, zinc. Argil is an exception to the law of expansion in solids; for, as has been already remarked, the bulk of pure clay diminishes, when heated, in the ratio of the intensity of the heat to which it is exposed. The cause of this anomaly has not been discovered. The expansion of liquids is more evident than that of solids, but not at all uniform; the differences apparently depending on the fixity or volatility of the components of the liquids: those expanding the most the boiling point of which is lowest; and which, consequently, most readily assume the gaseous form. The degree of their expansion, also, increases, with the augmentation of their temperature; or, the nearer a liquid approaches to the boiling point, the greater is the expansion produced by a degree of caloric; and the further it is from this point, the more equable is the expansion. Liquids, in the same manner as solids, suffer a difference of expansion from a given change of temperature. The following Table, by

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[1] For measuring higher temperatures than the thermometer can be subjected to, instruments named *pyrometers* have been employed; the best of which is that invented by Mr. Wedgewood. It depends on the degrees of contraction which pure argil suffers when exposed to high temperatures; and for this purpose small cylinders of pure clay are made in a mould, flattened on one side, and fitted exactly to the wider end of a gauge, consisting of two straight pieces of brass, 24 inches long, fixed on a brass plate so as to converge, and divided into inches and tenths. The length to which the pyrometrical pieces can be slid in the converging groove, indicates the heat to which they have been previously exposed; and as they do not expand again when cold, no fallacy can result from the action of heat on the gauge. Each degree of this scale is equal to 130° of Fahrenheit; and the 0, or commencement of it, corresponds with 1077½° of Fahrenheit's scale. The highest temperature that has been measured by it is 160° or 21·877° of Fahrenheit, which is 30° above the point at which cast iron melts. But, as much higher temperatures than this must exist, so also, there are temperatures much lower than can be measured by any thermometer.

Mr. Dalton, shows the expansion of the more common liquids, from 32° to 212° of Fahrenheit, the volume at 32° being denoted by 1.

Mercury.	Water.	Water saturated with salt.	Sulphuric acid.	Muriatic acid.	Oil of turpentine.	Ether.	Fixed Oils.	Alcohol.	Nitric acid.
$\cdot0200=\frac{1}{50}$	$\cdot0466=\frac{1}{21}\cdot5$	$\cdot0500=\frac{1}{20}$	$\cdot0600=\frac{1}{17}$	$\cdot0600=\frac{1}{17}$	$\cdot0700=\frac{1}{14}$	$\cdot0700=\frac{1}{14}$	$\cdot0800=\frac{1}{12}\cdot5$	$\cdot0110=\frac{1}{9}$	$\cdot0110=\frac{1}{9}$

To the general law of the expansion of liquids by heat, water furnishes an exception. Thus, from the lowest temperature at which water can remain liquid, to 40°, heat diminishes the bulk of water, instead of expanding it; but above 40° to 212° it expands it.

All gaseous bodies suffer the same expansion by the same additions of caloric, supposing the circumstances to be equal. Their expansion is almost perfectly equable, or the same augmentation takes place by the same addition of caloric at every degree of temperature between the freezing and the boiling point of Fahrenheit's thermometer. By the experiments of Gay Lussac, 100 parts of atmospheric air, heated from 32° to 212° expand 137·5 parts, or $\frac{1}{480}$th for every degree of the thermometer: and the other gases, the steam of water, and the vapour of ether, undergo the same expansions by the same augmentations of temperature. The cause of the equable expansion of gaseous bodies, appears to be the absence of cohesion; so that, at a low temperature, there is no more resistance made to the expansive power of the caloric thrown into the gas, than at a high temperature.

But, besides the change in bulk produced by the introduction of caloric into substances in different quantities, they are changed in state, assuming the *fluid form*, and that of *vapour*; or, they are *ignited*.

Fluidity is an effect of caloric, arising from the repulsive force of the caloric which enters into any substance fitted to take on the fluid form, separating the particles from each other to such a distance as to render them easily moveable on one another in every direction. All solids, with a very few exceptions, are susceptible of the fluid form, when exposed to a sufficient degree of heat; and all liquids, with the exception of alcohol, become solid when exposed to very low temperatures. The particular temperatures necessary for the production of these changes, however, are exceedingly various, but for the same bodies they are always the same.[1] In some cases, the change is sudden, or the body instantly passes from the solid to the liquid state; in other cases, it passes through several degrees of softness before it be perfectly liquefied: the conversion of ice to water is an example of the first; the melting of glass, of wax, and other unctuous matters, is an instance of the second. There are some bodies, nevertheless, which cannot be melted or *fused*, owing to their suffering chemical decomposition at a lower temperature than is required for their *fusion*:—a piece of wood, for instance, cannot be melted by any application of heat.

Although the melting point, in most cases, is always the same in the same bodies, yet circumstances may vary it; and the admixture of other substances may alter it very considerably. Thus, the melting point of ice, or, what is the same thing, the freezing point of water, is 32°; but, by exposing water slowly to the action of freezing mixtures, it may be cooled down to 22° before it freezes. The addition of salt renders this point still lower, as may be seen by the following Table.[2]

Names of salts.	Proportion by weight dissolved in 100 parts of water.	Freezing point.
Common salt.......	25·	4·
Sal ammoniac......	20·	8·
Rochelle salt........	50·	21·
Sulphate of magnesia	41·6	25·5
Nitre.............	12·5	26·
Sulphate of iron	41·6	28·
——— of zinc.....	33·3	28·6

When solids pass to the liquid state they receive an additional quantity of caloric, which combines with them, but does not sensibly elevate their temperature, and this *caloric of*

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[1] Table, showing the degree of temperature, according to Fahrenheit's thermometer, at which several solid bodies melt.

Lead - -	594°	Copper - - -	4587°, *Fahr.*	27, *Wedg.*	Spermaceti	112°
Bismuth -	476	Silver - - -	4717	——— 28	Phosphorus	100
Tin - - -	442	Iron - - - -	21637	——— 158	Tallow - -	92
Zinc - -	700	Sulphur - - -	218		Oil of anise	50
Antimony -	809	Bees-wax - -	142		Camphor -	303
Mercury	—39	Lard - - - - -	97		Ice - - -	32

[2] *Phil. Trans.* 1788, 27, quoted by Dr. Thomson—*Syst. Chemistry*, 4th edit. i. 520.

fluidity, or *latent heat*, as it has been named, is again given out in a sensible form, when the body returns to a solid state. If water, for example, be exposed to a great degree of cold, and kept free from agitation, it may be cooled several degrees below the freezing point, and yet remain fluid; but if it be then agitated, it instantly congeals, and at the moment its temperature rises to 32°. All fluids, therefore, are combinations of solids and certain doses of caloric. Thus, if snow at 32° be mixed with an equal weight of water at 172°, the snow instantly melts, but the temperature of the mixture is only 32°; so that 140° of caloric have disappeared or become latent: hence the quantity of caloric necessary to give fluidity to ice is 140°. These facts were first ascertained by Dr. Black in 1762; and fluidity in general has been proved to depend on a similar cause. Softness, plasticity, malleability, and ductility, probably depend also upon the repulsive force of the latent heat which combines with bodies.

Vapour, which is another effect of caloric, is that state into which all fluids and some solids pass when their temperature is raised to a certain point, or caloric is thrown into them in sufficient quantity to separate their integrant particles to distances beyond the sphere of the attraction of cohesion. The fluid passes to the aëriform state, becoming invisible and elastic, and possessing the other mechanical properties of air.

Evaporation, however, is also spontaneously produced, and besides being the conversion of a fluid to the state of vapour by the agency of caloric alone, seems to depend on the solvent power of atmospheric air, forming a solution of the body in the aërial fluid. By *spontaneous evaporation*, the fluid is gradually converted into the aëriform state at every temperature. Water, alcohol, ether, and volatile oils are susceptible of spontaneous evaporation, so that a portion of any of them exposed to the air in a flat vessel soon altogether disappears; "but sulphuric acid and the fixed oils never assume the form of vapour till they are raised to a certain temperature."

All fluids have a fixed point of temperature at which their vaporization commences, which is denominated their *boiling point*, and beyond this point fluids cannot be heated if freely exposed to the air, so as to allow the vapour to escape as it forms. Thus water at 212° boils, and is progressively converted into steam at the bottom of the vessel, which, rising in bubbles through the water, produces the ebullition that characterizes boiling; but although the fire be raised ever so much, yet the temperature of the water never exceeds 212°; the vapour carrying off every additional increment of heat in a latent form. The boiling point varies in different bodies;

and in the same body also, if it be placed under different circumstances, particularly with regard to pressure. Thus the boiling point of ether is 98°, of alcohol 176°, water 212°, mercury 660°, and so on. In a vacuum all liquids boil at a temperature 145° lower than in the open air; and in Papin's digester, in which water can be heated under a great pressure, the temperature may be raised to 300° without ebullition. Owing to this circumstance, highly volatile substances, as ammonia and ether, cannot be easily manufactured in elevated situations.

The elasticity of the vapour of liquids boiled in the open air is equal to that of the circumambient atmosphere; but under pressure, so that the temperature of the vapour may be much augmented, the elasticity increases with the temperature. At low temperatures, on the contrary, vapours lose their elasticity, are condensed, and return to their fluid state. The conversion, therefore, of liquids into elastic fluids depends on the same cause as the conversion of solids into fluids; namely, "to the combination of a certain dose of caloric with the liquid, without any increase of temperature."[1] The vapour carries off all the caloric which enters a body after it arrives at its boiling point; and retains it in a latent form: for the vapour is not hotter to the senses or the thermometer than the boiling liquid: thus, steam, the temperature of which is indicated by the thermometer to be 212°, is water combined with 940° of caloric, which remain latent as long as the temperature of the steam is maintained, but is again given out when a lower temperature changes that vapour to the state of a liquid.

Gases resemble vapours in their constitution, and differ from them only in the greater reduction of temperature which is required for their condensation, some of them not being reducible by ordinary pressure, or by any known reduced temperature, to the fluid or solid state. They are nevertheless very probably compounds of solid or liquid substances and caloric. Indeed several of the gases have been condensed into fluids, by the application of cold and pressure; oxymuriatic acid gas, for instance, becomes liquid at a little under 40°, and forms solid crystals at 32°; and ammoniacal gas condenses into a fluid at 45°.

Ignition is another effect of caloric, but differing altogether from expansion, fluidity, and evaporation, which may in some measure be regarded as different degrees of one general effect. It implies an emission of light from bodies which are much heated, or combined with a large portion of caloric, without their suffering any change of composition. It is totally independent of the presence of air, and is a simple effect of caloric. Aëriform substances are not susceptible of ignition.

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[1] The important discovery of the causes which produce the changes of bodies from the solid to the liquid and aëriform state was made by Dr. Black in 1760.

The degree of temperature at which all bodies capable of ignition begin to be ignited, or become red hot, is nearly the same,—about the 800th degree of Fahrenheit; and by raising the temperature the illumination increases, until a perfectly white light is produced, which is the highest point of ignition. Ignition is supposed to arise from the extrication of the light, which is regarded as a constituent of the ignited body, by the repulsive agency of the additional caloric; but this explanation of the phænomenon is liable to some objections, and the real cause remains still undetermined. As a pharmaceutical agent, *caloric* is of the first importance, in the majority of cases producing decomposition; but in others favouring combination. The decomposition most easily effected by it is the separation of the more volatile from the more fixed ingredients of compounds. Thus in the process of distillation (see *Operations*), when weak spirits are heated, the alcohol separates from the water, owing to its superior volatility, and by condensation is obtained as a distinct substance. Almost all compounds into which oxygen has entered without having occasioned combustion, as nitric acid, hyperoxymuriatic acid, and some metallic oxides, suffer likewise decomposition by caloric. All compound bodies containing combustibles are also decomposable by it; as are also compounds consisting of two or more combustible ingredients, in combination with oxygen, as almost all animal and vegetable matters. On the contrary, the compounds which are little or not at all affected by caloric, as far as regards the composition, are those which have been formed by combustion; such as water, phosphoric acid, and carbonic acid.[1] The proper application of caloric for the purpose of obtaining new combinations by lessening the force of aggregation, and thus favouring the attraction of affinity; or for producing decompositions by weakening or destroying altogether the force of these attractions, so as to obtain the principles of bodies in a distinct state, constitutes the most important feature of operative pharmacy. (See *Operations.*)

2. LIGHT.

Light is a substance consisting of very subtle particles which are constantly emanating in straight lines from luminous bodies. The size of these is too minute to be appreciated; but their velocity is estimated to be at the rate of 200,000 miles in a second. They appear to repel each other like those of caloric.

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[1] *Thomson's Chemistry*, 4th edit. i. 546.

A ray of light falling upon a polished surface is *reflected* from it at an angle equal to the angle of its incidence.

When a ray of light moving in a straight line passes within a certain distance of a body parallel to its direction, it bends towards the body, or is *inflected*; but when the body parallel to its course is at a greater distance, the ray is bent from it, or *deflected*. When it passes obliquely from one medium to another of a different density, it is bent a little from the line of its former direction, and assumes a new one, or is *refracted*. In passing into a denser medium it is refracted towards the perpendicular; but from the perpendicular when passing into a rarer medium. The refraction is proportional to the density of the medium, but in that of a combustible the refraction is greater than the ratio of its density.

Every ray of light is resolvable into seven other distinct rays, each possessing a different degree of refrangibility; and consequently divisible from each other by the prism. The ultimate or component rays are distinguishable by the impression of colours they excite on the eye; and are arranged in the following order, *red*, *orange*, *yellow*, *green*, *blue*, *indigo*, *violet*. The red is the least refrangible, reflexible, and inflexible; the violet the most; and that of the others follows the order in which they are placed. The colour of bodies depends on their transmitting or reflecting those rays only which excite the impressions of their colour. The reflection of the whole prismatic rays constitutes white; the absorption or suffocation of all or the greater part of these occasions black, which is the total absence of light.

The illuminating power of the rays of light differs. Those towards the middle of the prismatic spectrum, as above arranged, possess the greatest illuminating power; but this diminishes as the rays approach towards the extremities.

Light enters into combination with bodies; and in some cases is again extricated without any change being produced, as in pyrophori, or substances which absorb light, and emit it again when carried into a dark place. In some cases, however, the absorption of light by bodies occasions very sensible changes in them: the colour of plants, for example, their taste and odour, and the quantity of combustible matter they contain, depend on light: for a plant reared in the dark is nearly colourless, insipid, inodorous, and contains a very small proportion of combustible matter.

The natural sources of light are the sun and fixed stars; but it is also artificially produced by combustion, chemical combination, heat, and percussion. The sun's rays, the greatest source of light, have been found to be composed of three different species of rays; 1. rays which produce light and colour; 2. rays of mere heat; and, 3. rays which produce neither light nor colour, nor affect the thermometer; but which have the power of deoxidizing: and, thus constituted, it produces very important chemical effects.

Light partially deoxidizes metallic oxides and salts. Thus it blackens muriate of silver; and as this takes place when the salt is placed beyond the violet ray, or out of the prismatic spectrum, the effect is apparently to be attributed to the action of the third species of rays. It also reduces the nitro-muriatic solution of gold, when it is placed in contact with charcoal, or any other vegetable, or any animal matter; and the red oxides of mercury and of lead become much lighter when exposed to the sun; the rays that produce these effects are the least refrangible. Dr. Wollaston, however, has pointed out one exception to this effect of these rays, in guiaicum, which becomes green or oxidized in the least refrangible rays; and is again changed to yellow, or deoxidized in the most refrangible.

Light has a powerful tendency to decompose liquid oxymuriatic acid; and also nitric acid, which it renders red and fuming, even when it is contained in vessels accurately closed. Almost all the vegetable and animal colouring matters have their brilliancy and colour much impaired by long exposure to the sun's rays: they affect also the colour and the properties of vegetable powders kept in clear glass bottles. Light even seems to have a strong influence on the process of crystallization; for, if light be only partially admitted to a crystallizing solution, the crystals will be larger and more numerous on the enlightened side; and often the whole mass will radiate towards this point. Chaptal[1] found that by using a solution of a metallic salt, and shading the greater part of the vessel, capillary crystals shoot up the uncovered side, and the extent of the exposed part is distinctly marked by the limit of the crystallization.

Such are some of the properties of light, the chemical effects of the operation of which seem to be perfectly independent of its heating power ; and there is even reason to believe that the greatest chemical changes are produced by the invisible rays: for Ritter[2] affirms that, by transmitting the coloured rays through different prisms, he has separated them from the invisible or chemical rays, and obtained a coloured spectrum devoid of any chemical power.

3. ELECTRICITY *and* GALVANISM.

THE phænomena of electrity depend on a very subtile fluid, which is a powerful chemical agent, capable of producing immediate decompositions and new combinations. Galvanism appears to be essentially the same as electricity, differing however, in some degree in its effects and the mode of its production. Both are to be regarded as repulsive powers.

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[1] *Journal de Physique*, xxxiii. 297.

[2] *Nicholson's Journ.* viii. 216.

a. Electricity may be communicated to all substances: by some it is transmitted without any perceivable obstruction, but by others with much difficulty: hence bodies in their relation to electricity are distinguished into two classes, *conductors* and *non-conductors:* and as it can be accumulated in the latter by friction and other means, these are also denominated *electrics;* while the former are named *non-electrics,* to indicate their incapability of being excited.

Metals, water, and charcoal are conductors: all other substances are non-conductors; although many of these, when made very hot, become conductors. All electrics or non-conductors when rubbed, as, for instance, a glass rod with a piece of woollen cloth, attract light substances; and, when a conductor is approached to them, exhibit an appearance of light, attended with a peculiar sound and smell. Some electrics can be excited by simple heating or cooling. It is necessary, however, for obtaining any considerable excitation, that the rubber have some communication with the earth; from which it appears that the great source of electricity is in the earth, and that excitation consists in the mere transferring of the electrical fluid from one substance to another. By rubbing electrics on each other, the distribution of the electric fluid they contain is altered; and on separating them, more than the natural quantity remains with the one, and less with the other: the one is then said to be electrified *plus,* and the other *minus,* or *positively* and *negatively.* When two bodies are both electrified positively, or both negatively, they repel each other; but if one of them be electrified positively, and the other negatively, they attract each other. Instead of this distribution of the same fluid, the existence of two fluids has been assumed, each of which repels its own particles, but attracts those of the other; and this assumption is more favourable for the explanation of the chemical agency of this fluid.

The chemical effects of electricity seem to depend chiefly on its power of producing a sudden high temperature; and this appears to be proportioned to the resistance opposed to its transmission. It often favours chemical combinations, as that of oxygen with the metals, and promotes the instantaneous chemical union of gaseous bodies. It also effects chemical decompositions, as those of water, ammonia, alcohol, and metallic oxides. But for neither purpose is it employed as a pharmaceutical agent.

b. Galvanism may be regarded as a modification of electricity, in which the fluid is evolved during certain chemical actions. It is transmitted through those substances which are conductors of common electricity, and with the same degrees of facility and rapidity. The metals, charcoal to a certain extent, plumbago, water, the mineral acids, and saline solutions, are perfect conductors; water, alcohol, ether, sulphur, oils, resins, and metallic oxides, are imperfect conductors: but glass, dried and baked woods, the dry animal cuticle, and dry gases, are non-conductors of the galvanic fluid.

Galvanism is generally excited by arranging two different metals, as, for instance, copper and zinc, and a fluid, as nitric acid, diluted with twenty or thirty parts of water, in such a manner that the metals touch each other in one part, and have the fluid interposed between them in another.[1] The metals soldered together in pairs are placed transversely in the grooves of a well seasoned wooden, or an earthenware trough, and fixed in with a cement of resin and wax, to prevent any liquid from passing through; after which, the diluted acid is poured between the pairs, so that it touches the zinc of one pair, and the copper of another, alternately, the copper side of each double plate looking towards the same extremity of the trough throughout the arrangement, and the zinc side to the other extremity. This apparatus is named the galvanic battery; and the distances between the pairs of soldered plates should be from one-fourth to three-fourths of an inch each, according to the width of the trough. The intensity of action of this apparatus, as far as the production of heat is concerned, seems to depend on the size of the plates, or extent of surface; but, for producing chemical decomposition, on the number of plates, the more improved apparatus now used, is a trough of earthen-ware, divided in its length by numerous partitions of the same material. Into each of the cells thus formed, and filled with the diluted acid, a plate of zinc and of copper are placed, but not so as to touch each other; and a communication is made by a metallic arc between the zinc in one cell, and the copper in the next.

As a chemical agent, galvanism is the most powerful of all the repulsive forces, and is capable of producing decompositions which could not otherwise be effected. By its means the chemical constitution of the alkalies and the earths has been established, and their bases discovered to be substances hitherto unknown, which have been added to the list of metals.

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[1] The pile of Volta, which is not now employed, consists of plates of zinc and silver, and pieces of moistened woollen cloth, piled in the order of zinc, silver, cloth; zinc, silver, cloth, for twenty or more repetitions.

By placing a compound, one, for instance, of oxygen and an inflammable body, in connexion with the metallic wires proceeding from each end of a galvanic battery, the oxygen is attracted by the wire that is in the positive state, and repelled by that which is negative; while, at the same time, the inflammable is attracted by the negative wire, and repelled by the other. Hence the components are separated, and obtained in an insulated state. In the decompositions thus effected, substances can be conveyed to a distance, and even through interposed ponderable matter, by the galvanic influence; a result which, however singular, is well ascertained.

Galvanism, like electricity, acts as a stimulus to the living system. Its effects on the animal body are a sensation of light when applied to the eye; a sensation of acidity on the tongue; and the excitement of strong muscular action.

It would be entering too much into hypothetical discussion to attempt an explanation of the phænomena of galvanism; particularly as philosophers are not yet agreed upon the subject. Galvanism has not yet been employed as a pharmaceutical agent.

On the forces of attraction and of repulsion every chemical, and consequently every pharmaceutical effect, more or less depends. A knowledge, therefore, of the laws which regulate these powers is of the greatest importance, and forms the basis of all chemical science.

SECTION II.[1]

EVERY substance, whether it be regarded generally as forming a part of the mass of this globe, or particularly as an object of science, may be arranged in one or other of the three following classes; *Solids*, *Fluids*, and *Gaseous Bodies.* We shall now examine each of these classes separately, and endeavour to describe the constitutions and combinations of the substances composing them, inasmuch as they are objects of pharmacy.

I. SOLIDS.

SOLID bodies are masses of homogeneous particles combined and held together by the attraction of aggregation or cohesion. The arrangement of the particles with regard to each other is often such as to produce regular figures, in which case the solids are said to be crystallized. Cohesion and crystallization have been already considered.

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[1] In drawing up this section, I have borrowed very freely from the third book of Thomson's System of Chemistry, 4th edition.

A. CONSTITUTIONS OF SOLIDS.

Arrangement of the principal Solids according to their Composition.

I. SIMPLE, *or* UNDECOMPOUNDED.

Sulphur. *Carbon.* *Metals.*

II. COMPOUNDS.

Phosphorus.
Oxide of Sulphur.
——— *Phosphorus.*
Charcoal.
Metallic Oxides.
Sulphurets of Metals.
———— *fixed Alkalies.*
———— *Earths.*
Phosphurets of Carbon.
———— *Metals.*
———— *Earths.*
Carburets of Iron.
Alloys.
Solid Acids.
Earths.
——— *with Earths.*
———— *metallic Oxides.*
———— *fixed Alkalies.*
Salts and Hydrosulphurets.
Metallic Oxides with Alkalies.
Bitumens.
Soaps.
Most vegetable Substanccs.
Many animal Substances.

SIMPLE SOLIDS.

a. SULPHUR. Although the experiments of Sir H. Davy have unequivocally proved that hydrogen is always present in sulphur as we obtain it; yet, they afford no positive conclusion that it is an essential ingredient of sulphur. I have therefore followed Dr. Thomson in regarding it as a simple solid. For its properties, see PART ii. p. 389.

b. CARBON. The diamond is this substance in a state of purity; and, although, charcoal in its ordinary state almost invariably contains either hydrogen or water, yet, from the experiments of Messrs. Allen and Pepys, it is probable that charcoal is essentially as pure carbon as the diamond, and that the hydrogen it evolves depends on water which it always absorbs on the shortest exposure to the air. Carbon is a constituent of almost all vegetable and animal substances.

c. **METALS** are simple inflammable bodies, of great specific gravity, density, and opacity; and, as the result of these qualities, possess great brilliancy or lustre from their power of reflecting almost all the light which falls upon their surface. Their colours are generally shades of white, gray, or yellow; their hardness is considerable, and according to its degree they are more or less elastic: one only, mercury, is in a fluid state at the ordinary heat of the air. Many of them possess considerable tenacity, and are hence malleable and ductile; but some are extremely brittle. Metals are sapid and odorous when heated or rubbed; their fracture is generally hackly; their texture fibrous or foliated; and many of them are sonorous. They are excellent conductors of caloric, electricity, and galvanism. When exposed to the action of caloric, they expand and are melted; but differ greatly with regard to fusibility; some of them are volatilized at known temperatures. When fused, their surface is convex and globular; and in cooling they generally crystallize. They are very susceptible of oxidizement.

The following metals are used as pharmaceutical agents.

I. MALEABLE.

1. Silver. (*See Part* ii. p. 43.)
2. Mercury. (*Ibid.* p. 204.)
3. Copper. (*Ibid.* p. 145.)
4. Iron. (*Ibid.* p. 171.)
5. Tin. (*Part* ii. p. 384.)
6. Lead. (*Ibid.* p. 310.)
7. Zinc. (*Ibid.* p. 417.)

III. BRITTLE AND EASILY FUSED.

1. Bismuth.
2. Antimony. (*Part* ii. p. 39.)
3. Arsenic. (*Part* ii. p. 48.)

III. BRITTLE AND DIFFICUTLY FUSED.

1. Manganese. (*Part.* ii. p. 247.)

Bismuth is a reddish white coloured metal of a lamellar texture. Its specific gravity is 9·822. It fuses at 476° Fah. and crystallizes on cooling; in a higher temperature volatilizes; and on the access of air burns with a blue flame, emitting a yellow smoke, which is an oxide of the metal. The mineral acids act on it; and it readily combines with sulphur and most of the other metals.

a. **BORON** is obtained from the decomposition of boracic acid, in the form a deep olive coloured powder, insipid and inodorous. It undergoes no change at any temperature when heated in close vessels; but takes fire and burns like charcoal, when heated in the air to about 600°. During combustion it attracts oxygen and is converted into boracic acid. It is also converted into the acid by decomposing sulphuric and nitric acids when it is treated with them. It combines with the alkalies and sulphur. Sir H. Davy conceives it is a compound; and that one of its ingredients which enters into alloy with potassium and with iron, is the real basis of boracic acid.

b. COMPOUNDS OF SULPHUR.

1. *Oxide of Sulphur* is formed on the surface of sulphur which is kept for some time in a state of fusion. It has a violet colour, and a fibrous texture; is austere to the taste, tough; and its specific gravity is 2·325. It contains rather less than 7 per cent. of oxgen.
2. *Sulphurets of metals* are compounds of sulphur and metals, inodorous and insipid, often possessed of metallic brilliancy, brittle; and are conductors of electricity. Three of them only are officinal.

Table of Officinal Sulphurets of Metals.

Sulphurets.	Colours of the Sulphurets.	Specific Gravity.	Sulphur United to 100 metal.
Mercury	1. Black - -	8·16	8
	2. Red - -		16
Iron - -	1. Yellow -	4·518	57·1
	2. Yellow -	4·83	114·2
Antimony	Leaden gray	4·368	37·25

3. *Sulphurets of fixed alkalies* are opaque, solid bodies, of a brownish red or liver colour; decomposable by caloric, water, and acids; and which, by exposure to the air, are converted into hydrogureted sulphurets.
   Officinal. Sulphuret of potash, (*Part* ii. p. 562.)
4. *Sulphurets of earths* resemble the alkaline sulphurets in their properties.
5. *Hydrosulphurets* are compounds of sulphureted hydrogen with alkalies and earths. They are soluble in water, crystallizable, and are decomposed by the atmosphere and acids.

b. PHOSPHORUS is semitransparent, of a yellowish red colour, and a waxy consistence, but when perfectly pure is colourless and transparent. Its specific gravity is 1·770. It may be cut with a knife, is brittle at a temperature under 32°, but above that point softens, and under 90° is very ductile. It melts at 90°; in close vessels is volatized at 219°; and boils at 55°. When heated in the air to 148° it inflames, and emits a white smoke, which has an alliaceous odour, and condenses to an acid. It is obtained from urine, bones and other animal matters; and by Sir H. Davy's experiments appears to be a compound of an unknown base with hydrogen.[1]

1. *Oxide of phosphorus* produced by the exposure of phosphorus to dry air, has the appearance of fine white flakes, which take fire when slightly heated, and burn with a very vivid flame: by the further exposure to the air they attract moisture, and are converted into an acid.

2 *Phosphuret of carbon* (the substance which remains in the leather through which new-made phosphorus is strained, purified by exposure to heat in a retort,) is a light flocculent powder, of a bright orange, or rather red colour, insipid, and inodorous. It burns rapidly when heated in the air, and leaves charcoal behind.

Phosphurets of metals are generally brittle, and have a metallic lustre. (Vide *Annales de Chimie*, tom. i. & xiii.)

4. *Phosphurets of earths* have a brown colour; are generally luminous in the dark; insoluble in water, but decompose that fluid, furnishing phospureted hydrogen gas.

c. CHARCOAL? (*Part* ii. p. 87.)

d. METALLIC COMPOUNDS.

1. *Alloys* are compounds of two or more metals. They have generally lustre, hardness, tenacity, ductility, and other properties of the metals; but these properties in alloys differ from those of the metals from which they are formed. The compounds of mercury with other metals are named *amalgams*.

2. *Metallic oxides* are generally in the form of powders, or friable fragments not at all resembling the metals; sometimes laminated and crystallized; of various colours, determinate with regard to the metals and their treatment; heavier than the metals; and refractory, or fusible into glass. Some are insipid, others acrid and styptic; in general they are insoluble in water, and combine with acids, or with alkalies, or with both at the same time. They are reducible by light, by caloric, hydrogen, carbon, oils, &c.[2]

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[1] For experiment, the simplest mode of obtaining phosphorus is to mix a solution of phosphate of soda with a solution of acetate of lead, in the proportion of one part of the former salt to one quarter of the latter. This will yield a precipitate of phosphate of lead, from which phosphorus may be obtained by distillation.

Henry's Elements of Chemistry, ii. p. 7.

[2] As the same metal is susceptible of different degrees of oxidizement, it has been found necessary to designate the oxides thus formed by distinct appellations, indicative

Table of officinal metallic oxides, showing the quantity of oxygen united to 100 *of metal by weight in each.*

Metals.	Colour of Oxides.	Oxygen in 100 parts.	Metals.	Colour of Oxides.	Oxygen in 100 parts.
Silver - -	Olive	7·925	Zinc - -	White	24·41
Mercury	Black	4	Bismuth -	White	11·28
	Red	8	Antimony	Yellow	18·60
Iron - -	Black	29·5	Arsenic	White	34·93
	Red	44·25		Do.	52·4
Lead - -	Yellow	7·70			
	Red	11·08			
	Brown	15·60			

3. *Carburet of iron* (*plumbago*) is of a dark blue or gray colour; has some degree of metallic lustre, a greasy feel, is soft, and blackens the fingers. It is not altered by water or by air, nor affected by the most violent heat, if air be excluded; the acids do not affect it; it detonates with nitrate of potash, and reduces the metallic oxides. 100 parts appear to consist of 5 of iron, and 95 of carbon; with, perhaps, a minute proportion of hydrogen.
4. *Metallic phosphurets.*
5. *Metallic sulphurets.* Metals combine with different quantities of sulphur. The sulphurets are brittle, generally destitute of lustre, and differing in colour from the metals that form their basis.
6. *Metallic oxides with alkalies.*
7. *Earths.* (*Part* iii. p. 479.)
   Earths with earths.
   ———— *metallic oxides.*
   ———— *alkalies.*

e. SOLID ACIDS *and* SALTS in a crystallized state, contain a portion of water in their composition. The following are objects of pharmacy, or officinal:

1. *Phosphoric acid* is solid, colourless, transparent, and resembles glass in appearance; is inodorous, very acid, reddens vegatables blues, and deliquesces when exposed to the air. Its specific gravity in a state of dryness is 2·687. It is very soluble in water, dissolving with a

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of the comparative quantity of oxygen with which the metals thus formed are combined. The terms *protoxide*, *deutoxide*, *tritoxide*, and *peroxide*, imply that a metal is in its first, second, third and ultimate stage of oxidizement. — These terms were proposed by Dr. Thomson.

hissing noise; and is decomposed at a high temperature by carbon, hydrogen, and several of the metals: 100 parts consist of 46·72 of phosphorus, and 53·28 of oxygen.[1]

Phosphate of lime constitutes the basis of bones, from which it is procured in the state of a white powder by calcination, and solution in muriatic acid, from which it is precipitated by ammonia. It is inodorous, insipid, insoluble in water, but is decomposed by several of the acids: exposed to a heat of 378° Wedgewood, it softens, and changes to an enamel: 100 parts contain about 50·8 of acid, and 40·2 of lime.

Subspecies. 2. *Bi-phosphate of lime.*
Subspecies. 3. *Quadri-phosphate of lime.*
Subspecies. 4. *Sub-phosphate of lime.*[2]
Phosphate of soda. (*Part* iii. p. 477.)

2. *Boracic acid* is obtained in the form of white thin hexagonal scales, greasy to the feel. It reddens vegetable blues, is inodorous, but has a sour bitterish taste, leaving a cooling, sweet impression in the mouth. Its specific gravity is 1·479. It is fixed in the fire, but melts into a hard transparent glass. Boiling water dissolves only two parts of boracic acid: alcohol dissolves it, and the solution burns with a green flame; and oils also dissolve it with the assistance of heat. It oxidizes only iron, zinc, and perhaps copper? Its components are, according to the experiments of Sir H. Davy, one part by weight of borax, and two of oxygen.
   Sub-borate of soda. (*Part* iii. p. 371.)
3. *Benzoic acid.* (*Part* iii. p. 427.)
4. *Succinic acid.* (*Part* iii. p. 442.)
5. *Oxalic acid*, generally obtained by treating sugar with nitric acid, is in the form of white, transparent, shining, four-sided prisms, which have a very acid taste, redden vegetable blues, and are soluble in their own weight of boiling water. Exposed to heat in open vessels, it is decomposed. According to Berzelius, 100 parts contain 52 of real acid, and 48 of water; and the acid Dr. Thomson[3] found to be a compound.
6. *Tartaric acid* is obtained in white, irregular, hard, semitransparent crystals, the specific gravity of which is 1·5962. It readily dissolves in water; is capable of oxidizing iron, zinc, and mercury; and combines with

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[1] Rose.
[2] *Thomson's System of Chemistry*, 5th edit. vol. ii. p. 459.
[3] *Ibid.* p. 155.

alkalies, earth, and metallic oxides, forming tartrates. The crystallized acid consists of real acid 100 parts, water 13·43, and 100 parts of the acid of oxygen 64, carbon 32, hydrogen 4—100; are composed of 59·882 of oxygen, 34·167 of carbon, and 3·951 of hydrogen.[1]

Tartrate of potash. (*Part* iii. p. 469.)

Variety. *Supertartrate of potash.* (*Part* ii. p. 391.)

Tartrate of potash and soda. (*Part* iii. p. 471.)

7. *Citric acid.* (*Part* iii. p. 429.)

For descriptions of the remaining solid salts, (see *Part* iii)

f. Bitumens. (*Part* ii. p. 70.)

g. Soaps. The true nature of these compounds has been illustrated by Chevruel. He found that the fatty matter they contain consists of two distinct substances, which he has named *Steärin* and *Elaïn.* These, by the action of salifiable bases, are converted into two acids, the *margaritic* and the *oleïc*; and soaps are merely combinations of one or both with alkaline, earthy, or metallic bases. The alkaline soaps have a peculiar, unpleasant odour and taste, form a milky solution with water, and a transparent one with alcohol; are powerfully detergent, and are decomposed by the earthy and the metallic salts. 2. The earthy soaps are insoluble in water, and not detergent. 3. Metallic soaps are likewise insoluble in water, but some of them are soluble in alcohol, and others in oil.

1. *Hard soap.* (*Part* ii. p. 360.)
2. *Soft soap.* (*Ibid.* p. 361.)

Variety. *Liniment of ammonia.* (*Part* iii. p. 735).

3. *Liniment of lime-water.* (*Part* iii. p. 735.)

h. Solid vegetable substances. It is necessary to notice in this place the solid proximate principles only of the vegetable substances which are officinal, or employed as pharmaceutical agents. The constituents of the whole of them are — carbon, hydrogen, oxygen, and azote, in different proportions.

1. *Sugar.* (*Part* ii. p. 351.) It is soluble in nitric acid, and yields oxalic acid.

Variety. *Manna?* besides common sugar, contains mucilage and a nauseous substance to which it owes its purgative properties. When digested with nitric acid, it yields saclactic as well as oxalic acid. It does not ferment like sugar.

2. *Sarcocoll* is usually in oblong, semitransparent, yellow, globules, which have a bitter sweet taste, and an odour resembling in some degree that of anise seed. It does not

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[1] Berzelius.

crystallize. Soluble in water and alcohol. Treated with nitric acid yields oxalic acid.

Variety. *Liquorice?* Dissolves in nitric acid, and forms tannin; and when treated with sulphuric acid yields about one-fourth of its weight of charcoal. It is not susceptible of fermentation.

3. *Gum.* (*Part* ii. p. 4.)

Officinal. Acacia Gum.

Variety. *Mucus.* Inodorous, insipid, soluble in water, insoluble in alcohol; not precipitated by silicated potash, but precipitated by alcohol in a fibrous state.

Officinal. Linseed mucus, quince seed mucus, marsh mallow mucus.

4. *Cerasin.* This substance, which was formerly confounded with gum, is the produce of the astragalus *tragacantha.* For its physical properties, see (*Part* ii. p. 64.) With nitric acid it yields saclactic, malic, and oxalic acids.

Varieties. *Cherry tree gum? Congo gum; Dominica gum.*

Officinal. Tragacanth.

5. *Ulmin*[1]. This is a spontaneous exudation from the elm; but, as Berzelius has hinted, is probably a component of every bark. It is solid, black, hard, shining, and insipid. Soluble in water, but does not form mucilage; insoluble in alcohol; precipitated by nitric and oxymuriatic acids in the state of resin.

6. *Inulin* is obtained from the Inula *helenium* in the form of a white powder, which is insoluble in cold water and in alcohol. It is soluble in boiling water, forming a mucilaginous solution; but precipitates as the solution cools. Treated with nitric acid it yields malic and oxalic acids.

Officinal. Elecampane root.

7. *Starch.* (*Part* ii. p. 400.)

Varieties. *Potatoe starch; Salop; Tapioca.*

8. *Gluten* is of a gray colour, nearly insipid and inodorous, very tenacious, ductile, and elastic; partially soluble in water, and soluble in acetic and muriatic acid. Insoluble in alcohol and ether. When treated with nitric acid it yields oxalic acid.

9. *Fibrin* is tasteless, fibrous, elastic, and resembles gluten. It is insoluble in water, alcohol, and diluted alkali: but is soluble in acids, particularly nitric acid. It soon putrefies.

10. *Extractive* is obtained by evaporating aqueous vegetable infusions to dryness. It has a strong taste; and is

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[1] So named by Dr. Thomson.

soluble in water; but insoluble in alcohol and ether, unless when the extractive is united with resin. It is precipitated from its solutions by oxymuriatic acid, muriate of tin, and muriate of alumina; but not by gelatin.

Officinal. Catechu, most barks, &c.

11. *Emetin.* This substance is obtained from ipecauanha and some other roots which have an emetic property. It is in the form of brownish-red transparent scales, inodorous, but having a bitter and slightly acrid taste. It is very soluble in water, alcohol, and acetic acid, but insoluble in ether. Nitric acid converts it into oxalic acid. Half a grain, when swallowed, excites full vomiting.[1]

Officinal. Ipecacuanha root.

12. *Nicotin* is obtained from the leaves of several species of nicotiana. It is colourless, acrid, and has the odour of tobacco; is soluble in water and alcohol; and approaches the volatile oils in its properties. It is extremely poisonous.

Officinal. Tobacco leaves.

13. *Tannin* has a bitterish, astringent taste; is soluble in water, and in alcohol of 0·810. It is precipitated by the muriates of tin and of alumina, and by gelatins.

Officinal. Galls, uva ursi, tormentil, rhubarb, cinchona barks, swietenia, simarouba, kino, catechu, willow bark.

14. *Wax* is a fixed oil saturated with oxygen. (*Part* ii. p. 102.)

15. *Camphor.* The ultimate components are probably carbon and hydrogen, the proportion of carbon being greater than in oils. (*Part* ii. p. 226.)

16. *Scillitin.* This substance is procured from the bulb of the squill. It is white, transparent, and pulverulent: has an intensely bitter taste leaving a sweetish impression on the palate. It is soluble in water and alcohol, and when heated swells and exhales the odour of caromel.

Officinal. The bulb of the squill.

17. *Resins* are brittle, semitransparent, yellowish substances, inodorous, and having an acrid taste. Their specific gravity varies from 1·0452 to 1·2289. They melt when heated, inflame in a higher temperature, and burn with a strong

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[1] To obtain *Emetin* treat powder of ipecacuanha with ether at 60°, as long as it acts upon it: then boil the powder several times with fresh quantities of alcohol at 40°, and filter the boiling solutions, which will throw down as they cool a white flocculent precipitate: filter again and evaporate the clear solution in a water-bath. Melt the reddish residue which will be obtained, with cold water, and add magnesia, which will precipitate the *Emetin* that may be now obtained in a state of purity by dissolving the precipitate in alcohol, and evaporating the solution to dryness.

yellow flame, emitting much smoke. They are insoluble in water; but soluble in alcohol, ether, alkalies, and acetic acid. Nitric acid converts them into artificial tannin.

Officinal. Amber, copal, pine resins, mastiche.

18. *Guaiacum* differs from resins in being soluble in nitric acid, and yielding, when treated with it, oxalic acid, and no tannin.

19. *Pierotoxine* is procured from the fruit of Menispermum cocculus, in white, four-sided prismatic crystals; of an intensely bitter taste, soluble in twenty-five times its weight of water, and in three times its weight of alcohol and of ether. It is insoluble in oils. Nitric acid converts it into oxalic acid. It is intoxicating, and poisonous when swallowed.

Officinal. Cocculus Indicus.

20. *Morphia.* This is an alkaline substance procured from opium. It is in white pyramidal crystals, scarcely soluble in boiling water, but very soluble in alcohol and ether. It combines with the acids forming neutral salts. It acts with great energy on the animal economy.

Officinal. Opium, lactucarium.

21. *Balsams* resemble resins in their appearance; have a strong aromatic odour; yield benzoic acid when heated, or dissolved in sulphuric acid; and when treated with nitric acid yield artificial tannin.

Officinal. Balsams of tolu, benzoin, storax.

22. *Gum resins* resemble resins in their appearance; but are odorous, form milky solutions with water, and transparent solutions with alcohol. They are soluble in alkalies; and are converted into tannin by nitric acid.

Officinal. Ammoniacum, galbanum, scammony, assafœtida, myrrh, sagapenum.

23. *Wood* which forms the support of all vegetables, is composed of tasteless fibres, insoluble in water and alcohol; but soluble in weak alkaline ley; and in nitric acid yielding oxalic acid. When distilled *per se*, at a red heat, it leaves much charcoal.

i. SOLID ANIMAL MATTERS.

1. *Gelatin.* (*Part* ii. p. 12.)

2. *Albumen* when dried is a brittle, transparent, glassy substance, resembling gum in appearance. It is soluble in cold water, and when the solution consists of one part of dry albumen and 9 of water, heat coagulates it into a firm white solid mass: alcohol, ether, and the strong acids also coagulate the solution.

Officinal. White of egg.

3. *Solid oils* are composed, like the other fixed oils, of a

solid and a fluid substance which Chevreul has named *Stearin* and *Elain*.

Varieties—*a. Spermaceti.* (*Part* ii. p. 296.)

b. Fat is an odorous, insipid, white crystalline substance; greasy to the touch; melts at 140°; vaporized at 400°, the vapour being inflammable. Insoluble in water, alcohol, and ether; combines with alkalies, and forms soap; and is decomposed by strong acids.

Officinal. Lard, mutton suet, fat.

4. *Castor.* (*Part* ii. p. 94.)
5. *Musk.* (*Part* ii. p. 259.)
6. *Bones* and *Shells.* (*Part* ii. p. 278.)
7. *Horn.* (*Part* ii. p. 104.)

COMBINATION OF SOLIDS WITH SOLIDS.

Although solid bodies may be made to enter into combination with each other, yet all do not combine in the same manner, and under similar circumstances. Thus, some unite in any proportion; and some in certain determinate proportions only; while others will not combine with each other in any manner.

1. TABLE *of the principal Solids which have been ascertained to be capable of uniting in any Proportion.*

Sulphur with phosphorus.
Carbon with iron?
Metals with most metals.
Protoxide of antimony with sulphuret of antimony.
Earths with earths.
Earths with some metallic oxides.
Some earths with fixed alkalies.
Solid oils with each other, and with bitumen.

All the products are solids, except that of the first, which is liquid.

None of these solids combine spontaneously, even although placed in contact; but require to be mixed, and exposed to a degree of heat capable of melting one or both of them; in which case the caloric breaking the force of the cohesive attraction which retains the particles of the solids in the aggregate state, the atoms of the one substance are brought into immediate contact with those of the other, or within the sphere of the attraction of affinity, which consequently acts and produces the new compound. The compounds do not very materially differ in their properties from their constituents, except the compounds of iron with carbon, and some of the earths with each other. The combination, however, is generally accompanied with a change of density.

2. TABLE *of the principal Solids which have been observed to unite only in determinate proportions.*

Sulphur with metals.
———— some metallic oxides.
———— earths.
———— fixed alkalies?
Phosphorus with carbon.
———— metals.
———— some earths.
Acids with alkalies.
———— earths.
———— metallic oxides, &c.

These enter into more intimate union than the preceding. They, however, do not unite when both bodies remain in the solid state; "except sulphur and the fixed alkaline[1] hydrates, some acids, and a few hydrates of metallic oxides, and perhaps some of the acids, and the fixed alkaline hydrates:" hence they are brought into union, either by *fusion*, or by *solution in water*, or some other liquid menstruum. By the first mode, "sulphur is made to combine with metals, earths and fixed alkalies, and phosphorus with metals:" by the second, the acids are combined with the alkalies, earths, and metallic oxides. The mode of union resembles that of liquids with solids in every respect.

It is important to ascertain the *proportions* in which these bodies unite, and their *change of density*. Berthollet is of opinion, that sulphur may unite indefinitely with the metals, the proportion of sulphur varying indefinitely in many native sulphurets; but Dr. Thomson[2] maintains the contrary opinion, owing to the circumstance "that when sulphur and a metal are fused together, we obtain always the two bodies combined in determinate proportions."

The following Table (drawn up by the latter) compares the results of the analysis of metallic sulphurets, with a calculation founded on the supposition that the metals and sulphur unite atom to atom; that the weight of an atom of sulphur is 13; and that of an atom of the respective metals is as stated in the first column. The second column gives the weight of sulphur united to 100 parts of the metal by calculation; the third by analysis.

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[1] Alkalies in the crystalline form, or containing water solidified.

[2] *System of Chemistry*, 4th edit. iii. 136.

Metals.	Weight of a metallic atom.	Weight of sulphur combined.	
		By calculation.	By experiment.
Silver	95·7	14	17·6
Bismuth	93·7	14	17·5
Arsenic	54·5	24	25·
Copper	48·0	27	14 to 30
Mercury	120·0	10·8	17·6
Tin	48·0	27	17·6
Lead............	150·0	8·7	12 to 25
Antimony......	80·0	16·2	33·3
Iron	32·4	40	60 to 112

The metallic sulphurets are rarer than the mean of their components, owing to the substances expanding during their union sometimes more than one-fifth of the whole. Pyrites, however, is an exception, its specific gravity being greater than the mean.

Nothing precise is known of the other combinations of sulphur, or of those of phosphorus with solid bodies.

The combinations of the acids with alkalies, earths, and metallic oxides are well understood. When an acid and an alkali are mixed together, we find that, after several small additions of the alkali to the acid, diluted with a little water, the mixture still retains acid properties; but by continuing to add the alkali these disappear, and alkaline properties are acquired by the next addition that is made: the acid or the alkaline properties of the compound, therefore, predominate according to the proportions of each; but there are certain proportions, according to which they destroy, by their union, the properties of each other, so that neither predominates. In this case they are said to *neutralize* each other; the products are named *neutral salts*, and the proportions in which the acids and alkalies unite to form neutrals are fixed and determinate.

All salts, however, are not neutrals; but in some the proportions of the acid, in others, that of the base, predominate. The former, which are named *super-salts*, are supposed to be compounds of two atoms of the acid with one of the base; and the latter, which are named *sub-salts*, of two atoms of the base with one of the acid.[1] Thus supertartrate of potash consists of one atom of potash united to two of tartaric acid; or by weight, of 5·23 parts of base, and 100 of acid[2]: while carbonate of potash consists of two atoms of potash and one of carbonic acid; or by weight, of 2·75 of acid and 6·00 of base. *Triple salts*, are salts composed of one acid united to two bases at the same time, — as the tartaric acid, for instance, with potash and soda, to form the tartrate of potash and soda.

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[1] For an account of the Atomic Theory, I must refer my readers to Mr. Dalton's writings, and Thomson's *Annals of Philosophy*, passim.

[2] Berzelius.

The metalline salts are seldom neutral, having generally an excess either of acid or base.

II. LIQUIDS.

It has been already observed, that by throwing caloric into a solid body, or, in other words, heating it, the force of the attraction of cohesion which preserved it in the solid state is gradually weakened, and finally overcome. When the particles of a body which were at a low temperature immoveable relatively to each other, are separated by interposed caloric, so as to move easily upon each, but are yet within the limits of the sphere of the attraction of aggregation, the body is denominated a *liquid*, provided it remain in this state under the medium temperature of the atmosphere. Thus *Ice*, when brought into a place the temperature of which exceeds 32°, loses its solidity and becomes a liquid or water, which form it retains in every degree of temperature between 32° and 212° on the scale of Fahrenheit's thermometer. Let us now examine the constitution of liquids; their combinations with other liquids; and their combination with solids.

1. OF THE CONSTITUTION OF LIQUIDS.

Liquids may be regarded as compounds of caloric with a solid base. Their parts move easily upon each other, and yield to the smallest impression; but they are not sensibly elastic. The greater or smaller degree of liquidity of different substances depends upon a difference of the force of cohesion exerted between their particles, which may be regarded as placed in the limit between attraction and repulsion: thus the cohesion of mercury is greater than that of water. Liquids differ very much in specific gravity[1]; and the degree of this bears a relation to their density. "The distances of the atoms are so regulated, that the attraction and repulsion by which they are at once actuated just balance one another; while their form is such, that they can move freely among each other without altering these distances. It is this which seems to constitute the real cause of liquidity."

All liquids may be arranged into two great classes. "The following Table[2] exhibits a list of almost the whole of them arranged according to their composition."

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[1] See No. IV. of Appendix to Part I.

[2] *Thomson's Chemistry*, 5th edit. iii. p. 84.

I. SIMPLE.

Mercury. (*Part* ii. p. 203.)

II. COMPOUND.

a. Simple gases combined.

Water.
Nitric acid. (*Part* iii. p. 436.)

b. Gases with a solid base.

Sulphuric acid. (*Part* ii. p. 8.)
Alcohol. (*Part* iii. p. 636.)
Ethers. (*Ibid.* p. 665.)
Volatile oils. (*Ibid.* p. 576.)
Fixed oils. (*Ibid.* p. 70.)
Petroleum. (*Part* ii. p. 70.)
Supersulphuret of hydrogen.
Oxymuriate of tin.

c. Solidis combined.

Phosphuret of sulphur.
Sulphuret of carbon.

If mercury be excepted, all the known liquids are compounds; and the greater number of them contain water as an ingredient.

Water. The ordinary appearances and properties of this liquid are too well known to require description. Its maximum of density is at the temperature of 36°. A cubic foot of it, at 30 inches of the barometer, and 55° of the thermometer, weighs 998·74 avoirdupoise ounces of 437·5 grains troy each. It specific gravity is supposed = 1·000, and it is made the standard of unity in the measurement of the gravity of every other liquid. The gravity of ice is less than that of liquid water. In the form of steam it occupies 1800 times the space which it does in the form of water. It is not decomposed by heat alone; nor altered by light: but is decomposed by iron, zinc, antimony, and tin, when assisted by heat. It readily absorbs air and gases[1]; and is a constituent of all gases. It is a compound of oxygen and hydrogen, 100 grains containing 88·286 of oxygen, and 11·714 of hydrogen.[2] It liquefies a great number of solid bodies, its solvent power being increased by diminishing the pressure of the atmosphere; and, as has been already stated, the greater number of liquids contain it as an ingredient.

Supersulphuret of hydrogen is a transparent, colourless liquid when pure, but more frequently has a greenish-yellow tinge. It has a strong peculiar odour, and a pungent yet cooling taste. Its specific gravity is 1·3. It burns like spirit of wine, and during the combustion emits a sulphurous odour. It is a compound of 96·75 parts of sulphur, and 3·25 of hydrogen.

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[1] From Mr. Dalton's experiments, it appears that water absorbs its own bulk of carbonic acid gas, of sulphureted hydrogen gas, and of nitrous oxide, $\frac{1}{27}$ of oxygen gas, nitrous gas and carbureted hydrogen; and $\frac{1}{8}$ of carbonic oxide, azotic gas and hydrogen gas.

[2] Biot and Arago.

Oxymuriate of tin is a transparent liquid, which exhales a very heavy dense smoke when exposed to the air. Twenty-two parts of it united with seven of water condense into a solid mass. It yields by evaporation small crystals, which are deliquescent, and sublime in a moderate heat.

Phosphuret of Sulphur is of a yellowish colour, and exceedingly inflammable.

Sulphuret of Carbon is a transparent colourless liquid, having an acrid, pungent, slightly aromatic taste and fœtid odour. It is very inflammable, burning with a blue flame, and emitting fumes of sulphurous acid. It is a compound of 84·83 parts of sulphur, and 15·17 of carbon.

2. COMBINATION OF LIQUIDS WITH EACH OTHER.

When liquids are mixed together they either unite in any proportions, or in certain determinate proportions only, or they cannot be united, but separate, howsoever carefully they be mixed together; or they decompose each other.

I. TABLE *of Liquids which unite when mixed together in any proportions, and do not afterwards spontaneously separate.*

Water with alcohol.
———— nitric acid.
———— sulphuric acid.
Alcohol with ether.
Sulphuric acid with nitric acid.
Fixed oils with petroleum.
———— volatile oils.
———— fixed oils.
Valatile oils with petroleum.
———— volatile oils.

When these liquids are mixed together, such a mutual penetration takes place, that every portion of the mixture contains the same proportions of both ingredients; and this is the case although there may be the greatest difference in the specific gravity of the individual liquids. Agitation assists the rapidity of this effect very much, but the mixture is never perfect until some time afterwards. If, on the contrary, agitation be not employed, the mixture is always more quickly effected when the denser liquid is added to the rarer; for in the opposite case a long period often elapses before it be completed. A partial muddiness occurs when even transparent liquids of different densities are mixed together, and continues until the mixture be perfect; but when it is complete, the compound is homogeneous, and the liquids do not afterwards separate from each other.

As the density and specific gravity of a compound thus formed are always greater than the mean, caloric is evolved during the mixture. In some cases the quantity is scarcely sensible; but in other cases it is capable of affecting considerably the thermometer: thus, if fixed and volatile oils, be mixed, the temperature is not very sensibly raised; but if four parts of sulphuric acid and one part of water, both at 32°, be mixed together, the temperature rises to 212°. When equal parts of sulphuric acid and water are mixed, the density is augmented by 13 per cent.; of nitric acid and water, the increase is equal to one-twelfth; and when water and pure alcohol are mixed, it is rather more than one-twenty-eighth of the whole weight. These mixtures are cases of real chemical combination; the force which holds them combined being that of chemical attraction exerted between the integrant particles of the two liquids.

II. TABLE *exhibiting a list of the Liquids that unite with each other only in certain proportions.*

Water with ether.
——————volatile oils.
——————sulphuret of carbon.
——————oxymuriate of tin.
Alcohol with volatile oils.
—————— petroleum.
—————— supersulphureted oxygen?
—————— phosphuret of sulphur?
Ether with volatile oils.
——————petroleum.
Volatile oils with petroleum.

Water dissolves rather less than one-tenth of its bulk of sulphuric ether; and the proportion of volatile oil it takes up is also very minute; being scarcely more than is sufficient to communicate its odour to that liquid, without any other of its properties. It has been already stated, that twenty-two parts of the fuming oxymuriate of tin mixed with seven of water unite and condense into a solid mass. Although alcohol unites readily with the volatile oils, yet the quantity of each is limited: and the proportion of petroleum which alcohol dissolves is also very small. The proportions of volatile oils and petroleum which ether dissolves are considerable.

The affinity of the compounds of this table is much weaker than of those of the former; which, " with the difference between the cohesion of the particles of the two liquids, limits the combination to certain proportions." They are also more easily decomposed; for, if a spirituous solution of volatile oil be poured into water, the alcohol leaves the volatile oil to unite with the water, while the greater part of the separated oil swims on the surface of the new compound.

III. TABLE *exhibiting the principal Liquids which do not sensibly combine in any proportion.*

Water with petroleum.
——————— fixed oils.
——————— supersulphureted hydrogen.
Fixed oils with alcohol.
————— ether.
Mercury with water.
——————— alcohol.
——————— ether.
——————— volatile oils.
——————— petroleum.

In these cases the affinity between the two liquids is not sufficient to overcome the cohesion between the particles of each liquid. The spreading of oil, however, upon the surface of water, and adhering to it, is supposed to depend on the exertion of some degree of affinity, although less than is requisite to produce a combination of the two liquids.

If a liquid have an affinity for one of the constituents of another liquid, although not for the liquid itself, it frequently decomposes it, and forms new compounds.

IV. TABLE *of the principal Liquids which decompose each other.*

Water, by phosphuret of sulphur.
Nitric acid, by all the liquids, except water and sulphuric acid.
Sulphuric acid, by all the liquids, except nitric acid and water.

During the first case of decomposition, which is facilitated by a high temperature, sulphureted and phosphureted hydrogen exhale, and sulphuric and phosphoric acids are formed.

The combinations of solids, reduced to the liquid state, are regulated by the very same laws as those of proper liquids.

3. OF THE COMBINATION OF LIQUIDS WITH SOLIDS.

The principal liquids, the action of which upon solids has been examined, are *water*, *alcohol*, *ether*; *petroleum*, *volatile oils*, *fixed oils*, *mercury*, and the *acids*, which have been already noticed.

a. Water enters into combination with solid bodies in two states. In the first the proportion of solid matter exceeds that of water, and the liquid becomes a part of the solid body without rendering it liquid; in the second, the solid is much exceeded by the quantity of fluid, which liquefies it, and imposes its peculiar form upon the compound. The products of the first state are denominated *hydrates;* the second constitutes *solutions.*

I. TABLE *of hydrates or compounds of solid bodies and water, still retaining the solid form.*

1. *Sulphur* is found native in the state of a hydrate; but the hydrate most generally known is precipitated sulphur, (*Part* iii. p. 389.)
2. *Metallic oxides,* when in the state of hydrates, are powders possessed of very intense colour, having usually a strong taste, and being easily acted upon by acid or alkaline solutions.
3. *Earthy hydrates* are powders, and sometimes crystals.
4. *Alkaline hydrates* are what are commonly termed the crystals of alkalies,
5. *Acid hydrates* are those acids which are generally procured in a solid state, and known under the name of crystallized acids.
6. *Saline hydrates* comprehend the whole class of saline preparations, whether assuming the form of crystals, powders, or solid masses.
7. *Hydrates of hydrosulphurets* are the crystallized hydrosulphurets.
8. *Soaps* are hydrates, water being always present in them as a constituent.
9. *Tannin* and many animal and vegetable solids.

In the two last classes the proportion of combined water does not appear to be determinate, although this is the case with all the others.

Solution.—During solution, both bodies, or the solid and the liquid, act mutually upon each other at the same time; and the force exerted by each is equal to its mass. The action goes on at the point of contact only: hence, as far as the mass is concerned, the quantity of liquid has no effect in hastening the solution. When a solid body is plunged into a liquid, if the affinity between them be weak, the combination of the two goes on as long only as the force of the affinity is able to overcome the force of cohesion of the particles of the solid; when it stops, the compound remains solid, and is consequently a *hydrate.* But if the affinity be strong, the cohesion of the solid is gradually destroyed, and its particles being united with those of the liquid are dispersed equally through it, forming a *solution.* By the addition, however, of new portions of the solid, the action of the liquid is gradually weakened; and at length, being unable to overcome the cohesion of the solid, no more of it is dissolved. In this case, the sums of the force of the attraction of affinity exerted between the solid and the liquid, and of the force of the cohesive attraction of the particles of the solid for each other, are balanced; and the liquid is said to be *saturated.* The union of the two bodies is effected by chemical combination. If a portion of the liquid be now abstracted, (as for example by evaporation,) the force of the cohesive attraction of the particles of the solid becomes again superior to the force of the affinity which separated them, so that the solid is reproduced. When this is slowly accomplished, it produces crystallization, the phænomena of which have been already noticed.

In the formation of hydrates the increase of density is often very great, and much caloric is evolved. Thus, hydrate of lime is specifically heavier than pure lime. Hydrate of alum, which is simply crystallized alum, has a specific gravity of 1·7065; but when its water is driven off by calcination, the gravity is reduced to 0·4229; and crystallized nitrate of potash, or hydrate of nitre, is of the specific gravity 1·9639; but nitre deprived of its water of crystallization is only 1·7269.

The density of solutions is greater than the mean, when pure solids are employed; but when it is the hydrates which are dissolved, the specific gravity is more generally less than the mean. The following useful Tables, drawn up by Hassenfratz, show the specific gravity of saline solutions containing different proportions of salt, at 55°.[1] By consulting them we can readily know the exact quantity of salt contained in any saline solution of a specific gravity corresponding with the numbers marked in the tables; and when the gravity of the solution is not found in the tables, its saline contents can still be found by calculation.

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[1] The salts were generally in the crystallized state. The column belonging to each salt terminates at the point of saturation, at the temperature of 55°.

TABLE OF SALINE SOLUTIONS.

Weight of Salt in 100 parts of the Solution.	Sulphate of Soda.	Sulphate of Potash.	Alum.	Weight of Salt in 100 parts of the Solution.	Sulphate of Magnesia.	Sulphate of Iron.	Sulphate of Zinc.	Sulphate of Copper.
1	1·0039	1·0086	1·0047	2	1·0096	1·0096	1·0080	1·0141
2	1·0078	1·0171	1·0094	4	1·0192	1·0203	1·0165	1·0280
3	1·0116	1·0257	1·0142	6	1·0286	1·0314	1·0255	1·0413
4	1·0154	1·0343	1·0189	8	1·0379	1·0436	1·0345	1·0539
5	1·0192	1·0429	1·0236	10	1·0470	1·0560	1·0440	1·0660
6	1·0230	1·0515		12	1·0555	1·0696	1·0540	1·0795
7	1·0268			14	1·0646	1·0829	1·0665	1·0938
8	1·0306			16	1·0711	1·0961	1·0790	1·1083
9	1·0344			18	1·0771	1·1095	1·0915	1·1230
10	1·0381			20	1·0860	1·1220	1·1040	1·1380
11	1·0418			22	1·0976	1·1358	1·1165	1·1513
12	1·0455			24	1·1092	1·1498	1·1290	1·1747
13	1·0492			26	1·1178	1·1638	1·1420	
14	1·0528			28	1·1324	1·1781	1·1550	
15	1·0564			30	1·1440	1·1920	1·1680	
16	1·0598			32	1·1557	1.2031	1·1820	
				34	1·1675	- -	1·1960	
				36	1·1789	- -	1·2100	
				38	1·1905	- -	1·2240	
				40	1·2122	- -	1·2380	
				42	1·2262	- -	1·2525	
				44	1·2302	- -	1·2680	
				46	1·2432	- -	1·2855	
				48	1·2562	- -	1·3045	
				50	1·2683	- -	1·3310	
				52	1·2833	- -	1·3485	
				54	1·2973	- -	1·3565	

TABLE OF SALINE SOLUTIONS—*continued.*

Weight of Salt in 100 parts of the Solution.	Muriate of Soda.	Muriate of Potash.	Hyperoxymuriate of Potash.	Muriate of Ammonia.	Muriate of Barytes.	Weight of Salt in 100 parts of the Solution.	Muriate of Magnesia.	Muriate of Lime.
1	1·0064	1·0047	1·0055	1·0029	1·0073	2	1·0068	1·0125
2	1·0128	1·0095	1·0105	1·0059	1·0146	4	1·0136	1·0212
3	1·0192	1·0143	1·0150	1·0089	1·0217	6	1·0204	1·0319
4	1·0256	1·0192	1·0193	1·0118	1·0289	8	1·0274	1·0429
5	1·0320	1·0240	1·0220	1·0149	1·0360	10	1·0340	1·0540
6	1·0384	1·0288	1·0301	1·0179	1·0430	12	1·0408	1·0650
7	1·0448	1·0338	1·0376	1·0209	1·0503	14	1·0476	1·0759
8	1·0502	1.0388	1·0461	1·0239	1·0575	16	1·0554	1·0870
9	1·0576	1·0438	1·0567	1·0269	1·0647	18	1·0612	1·0979
10	1·0640	1·0490	- -	1·0300	1·0720	20	1·0681	1·1000
12	1·0775	1·0612	- -	1·0358	1·0919	22	1·0751	1·1212
14	1·0910	1·0701	- -	1·0416	1·1014	24	1·0823	1·1323
16	1·1045	1·0801	- -	1·0474	1·1309	26	1·0895	1·1445
18	1·1182	1·0901	- -	1·0532	1·1504	28	1·0967	1·1547
20	1·1320	1·1000	- -	1·0590	1·1700	30	1·1040	1·1670
22	1·1462	1·1090	- -	1·0642	1·1901	32	1·1114	1·1803
24	1·1608	1·1178	- -	1·0693	1·2227	34	1·1190	1·1935
26	1·1760	1·1264	- -	- -	1·2363	36	1·1266	1·2067
28	1·1920	1·1344	- -	- -	1·2600	38	1·1343	1·2198
30	1·2100	1·1420				40	1·1420	1·2330
						42	1·1507	1·2478
						44	1·1597	1·2528
						46	1·1686	1·2789
						48	1·1777	1·2949
						50	1·1870	1·3120
						52	1·1963	1·3310
						54	1·2068	
						56	1·2164	
						58	1·2261	
						60	1·2380	
						62	1·2507	
						64	1·2646	

TABLE OF SALINE SOLUTIONS—*continued.*

Weight of Salt in 100 parts of the Solution.	Nitrate of Potash.	Acetate of Lead.	Acetate of Iron.	Tartrate of Soda.	Tartrate of Potash.	Phosphate of Soda.	Borax.	Soda of Commerce.	American Potash.
1	1·0063	1·0070	1 0035	1·0034	1·0050	1·0040	1·0040	1·0042	1·0050
2	1·0125	1·0140	1·0075	1·0072	1·0102	1·0081	1·0084	1·0086	1·0102
3	1·0186	1·0211	1·0112	1·0108	1·0153	1·0120	1·0122	1·0130	1·0156
4	1·0244	1·0283	1·0150	1·0148	1·0212	1·0166	- -	1·0175	1·0212
5	1·0302	1·0366	1·0188	1·0190	1·0258	1·0200	- -	1·0220	1·0269
6	1·0353	1·0430	1·0225	1·0231	1·0311	1·0237	- -	1·0264	1·0327
7	1·0408	1·0505	1·0264	1·0272	1·0363	1·0270	- -	1·0310	1·0385
8	1·0468	1·0580	1·0302	1·0313	1·0417	1·0300	- -	1·0356	1·0443
9	1·0531	1·0655	1·0341	1·0355	1·0470	- -	- -	1·0403	1·0503
10	1·0595	1·0731	1·0380	1·0397	1·0525	- -	- -	1·0458	1·0563
12	1·0722	1·0891	1·0458	1·0481	1·0634	- -	- -	1·0544	1·0684
14	1·0850	1·1055	1·0537	1·0567	1·0744	- -	- -	1·0640	1·0807
16	1·0984	1·1221	1·0616	1·0655	1·0856	- -	- -	1·0736	1·0930
18	1·1119	1·1330	1·0697	1·0745	1·0968	- -	- -	1·0833	1·1053
20	1·1235	1·1560	1·0780	1·0837	1·1080	- -	- -	1·0930	1·1179
22	1·1389	1·1740	1·0863	1·1032	1·1196	- -	- -	1·1031	1·1307
24	1·1520	1·1928	1·0948	1·1153	1·1317	- -	- -	1·1135	1·1438
26	- -	- -	1·1045	1·1283	1·1447	- -	- -	1·1241	1·1571
28	- -	- -	1·1140	1·1436	1·1569	- -	- -	1·1349	1·1724
30	- -	- -	1·1224	1·1600	1·1700	- -	- -	1·1460	1·1840
32	- -	- -	1·1323	1·1801	1·1838	- -	- -	- -	1·1989
34	- -	- -	- -	- -	1·1978	- -	- -	- -	1·2142
36	- -	- -	- -	- -	1·2118	- -	- -	- -	1·2304
38	- -	- -	- -	- -	1·2259	- -	- -	- -	1·2478
40	- -	- -	- -	- -	1·2400	- -	- -	- -	1·2660
42	- -	- -	- -	- -	1·2547	- -	- -	- -	1·2882
44	- -	- -	- -	- -	1·2696				
46	- -	- -	- -	- -	1·2861				
48	- -	- -	- -	- -	1·3015				
50	- -	- -	- -	- -	1·3180				
52	- -	- -	- -	- -	1·3351				
54	- -	- -	- -	- -	1·3527				
56	- -	- -	- -	- -	1·3707				
58	- -	- -	- -	- -	1·3902				
60	- -	- -	- -	- -	1·4120				

If a new substance be added to the saturated solution of another substance, the result is different according to the nature of the matters employed. Sometimes the second substance is not dissolved: thus a saturated solution of muriate of lime at 60° cannot dissolve any common salt. Sometimes the whole, or a part of the new solid, is dissolved without any of the already combined solid being lost or precipitated: thus a saturated solution of nitrate of potash at 51° can dissolve more muriate of soda than pure water, and the same is the case with nitrate of soda; but in the latter case, a great portion of the nitrate is precipitated. Sometimes the new solid is dissolved at the expence of the whole of the substance already dissolved, which is consequently precipitated: thus, if a sufficient quantity of muriate of soda be added to a saturated solution of muriate of ammonia at 61°, the former salt is dissolved, but the whole of the latter precipitates during its solution. This last result, however, does not take place at every degree of temperature; for at a boiling heat muriate of soda is separated by those very salts which it precipitates at a low temperature.

b. Alcohol acts less extensively upon solids than water; and it forms no solid combinations similar to the hydrates.

Table of the solids which Alcohol is capable of dissolving.

1. Sulphur.
2. Phosphorus, and its compounds.
3. Fixed alkalies.
4. Some of the alkaline earths in minute portions.
5. Most of the solid acids.
6. Many salts.
7. Alkaline sulphurets.
8. Alkaline soaps.
9. Tannin, and many vegetable substances.

A mixture of water and alcohol appears to possess greater energy as a solvent in many cases than either of them in a separate state.

c. The action of ether upon solids is still more limited than that of alcohol.

d. The action of mercury as a liquid is altogether confined to the metals, for many of which it has a considerable affinity, and forms compounds with them which are denominated *amalgams.* None of these are objects of pharmacy.

III. GASES.

GASES are aëriform fluids possessed of very different properties, but all agreeing in that peculiar kind of elasticity which constitutes aërial bodies.

1. CONSTITUTION OF GASES.

The particles of *gases*, like those of liquids, are moveable upon each other; but gases differ from liquids in possessing elasticity, or that power which allows them to be compressed into a smaller bulk; and by which, however large a portion of any gas contained in a vessel be taken away, the small portion which is left is enabled to expand so as to fill the vessel. The bulk of common air may be thus easily reduced or increased 3000 times; and indeed there does not appear to be any limit to expansion. These properties of airs depend on the repulsion which exists between their component particles; and the force of which, according to Newton, is always inversely as the distance of their centres from each other. As gases contain a larger proportion of combined caloric than any other class of bodies, it is very probable that caloric is the cause of the repulsion which exists between their particles, or of their elasticity; and hence the addition of sensible heat to gases increases their elasticity, while the abstraction of it, or the application of cold, diminishes it. No degree of compression, nor abstraction of caloric, can alter the constitution of real gases or airs; but by these means, others and all the vapours can be reduced to the liquid or even the solid state.

Arrangement of the known gases according to their composition.[1]

I. SIMPLE GASES.

1. Oxygen gas.
2. Hydrogen gas.
3. Azotic gas.
4. Oxymuriatic acid gas (Chlorine.)
5. Sulphur vapour.
6. Iodine vapour.

II. COMPOUND GASES.

a. Simple gases combined.

7. Hydriodic acid.
8. Hyperoxymuriatic acid gas (protoxide of chlorine.)
9. Nitrous gas (protoxide of azote.)
10. Nitrous oxide (deutoxide of azote.)
11. Muriatic acid gas.
12. Steam.[2]
13. Ammonia.

b. Oxygen and a solid base.

14. Carbonic oxide.
15. Carbonic acid gas.
16. Sulphurous acid gas.
17. Sulphuric acid vapour.

c. Hydrogen and a solid base.

18. Cyanogen.
19. Olefiant gas.
20. Carbureted hydrogen gas.
21. Phosphureted hydrogen gas, hydroguret of phosphorus.
22. Bihydroguret of phosphorus.

d. Fluorine, chlorine, cyanogen, with a base.

23. Fluoboric acid.
24. Chlorocyanic acid.
25. Hydrocyanic (Prussic) acid.
26. Chlorocarbonic acid.

e. Triple or quadruple compound gases.

27. Hydriodic ether.
28. Chloric ether.
29. Sulphuric ether.
30. Muriatic ether.
31. Vapour of alcohol.
32. ——— of oil of turpentine.

All these gases are invisible, except the oxymuriatic acid and the hyperoxymuriatic acid, which have a yellowish green colour; but when gases of very different specific gravity are mixed together, they become in a certain degree visible. With respect to the specific gravity of gases, there is a greater difference between them under the same pressure, and at an equal temperature, than exists between liquid substances; a circumstance which must depend either on a difference of the repulsive force, or of the weight of the atoms in different gases.

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[1] *Thomson's Chemistry*, 4th edit. iii. 437.

[2] Steam is not, in strict language, a gas; but a condensable vapour.

A Table of the density and weight of 100 *cubic inches of the gases at the temperature of* 60°, *and a barometric pressure of* 30°.

	Specific Gravity.	Weight of 100 cubic Inches.		Specific Gravity.	Weight of 100 cubic Inches.
Air - -	1·000	30·5	Olefiant Gas -	0·974	29·720
Oxygen -	1·111	33·888	Carbureted hydrogen	0·555	16·99
Hydrogen -	0·0694	2·117	Hydroguret of Phosphorus - -	0·9022	27·517
Azote - -	0·9722	29·652			
Chlorine - -	2·500	76·250	Bihydroguret of Phosphorus -	0·9716	29·634
Sulphur Vapour -	1·111	33·888			
Vapour of Iodine -	8·678	264·679	Fluoboric Acid -	2·3709	72·312
Hydriodic Acid -	4·375	133·434	Chlorocyanic acid vapour - - -	2·152	65·636
Protoxide of Chlorine	2·440	74·420			
Protoxide of Azote -	1·5278	46·598	Hydrocyanic acid vapour - - -	0·9368	28·572
Deutoxide of Azote	1·0416	31·769			
Muriatic Acid -	1·284	39·162	Chlorocarbonic Acid	3·472	105·896
Steam - -	0·625	19·062	Hydriodic Ether -	5·475	166·987
Ammonia -	0·590	18·000	Chloric Ether -	3·474	105·957
Carbonic Oxide -	0·9722	29·652	Sulphuric ether vapour	2·566	78·873
Carbonic Acid -	1·527	46·373	Muriatic Ether -	2·219	67·679
Sulphurous Acid	2·222	67·771	Alcohol Vapour -	1·6133	49·206
Sulphuric Acid -	2·777	84·698	Oil of Turpentine Vapour - -	5·013	152.896
Cyanogen -	1·804	55·028			

Water is a constituent of almost every gaseous body; and the quantity of it contained in each depends upon the bulk, not the density, of the gas. It also appears probable, that the weight of it contained in 100 inches of all gases under the same pressure, and at the same temperature, is very nearly the same. It can be separated, in a great degree, by very dry alkalies, lime, and other matters which have a powerful attraction for water; but the whole of the moisture cannot be absorbed by these substances; and it does not appear that gases cannot exist independent of the presence of water. The quantity present in any gas is regulated, in a great degree, by the temperature: for, if this be high, a much larger proportion of moisture can be retained in the elastic form; but in a low temperature it is deposited.

Vapours differ from gases in several particulars. Their "elasticity does not increase as the pressure, like that of gases;" they can be condensed by pressure, and by the abstraction of caloric, into liquids. By the latter mode, also, some of those bodies which are regarded as real gases, such as ammonia and oxymuriatic gas, are reduced to the liquid form. The elasticity of the majority of vapours is sensible at a high temperature only; but some become sensibly elastic at the common temperature.

2. OF THE MIXTURE OF GASES WITH GASES.

1. Gases may be mixed together in the same manner as liquids, and with nearly similar results. Some never intimately combine, or are merely mechanically mingled, while others unite closely, and form new chemical compounds, possessing properties very different from those of their components.

TABLE *of gases which may be mixed together without any apparent change in their state.*

i. Gases that may be mixed, but which do not combine.
  Oxygen with fluoboric, fluosilic, and carbonic acid gases.
  Hydrogen with muriatic acid, fluoboric acid, and fluosilic acid; carbonic oxide, olefiant gas, carbureted hydrogen, phosphureted hydrogen, sulphureted hydrogen, and ammoniacal gas.
  Azote, with almost all the other gases.
  Fluoboric acid and fluosilic acid, with all the other gases.
ii. Gases which mix without any change, but may be made to combine.
  Oxygen with oxymuriatic acid, iodine, hydrogen, azote, carbonic oxide, sulphurous acid, and nitrous oxide.
  Hydrogen with oxymuriatic acid, iodine, and azote.
iii. Gases which mix without change, but may be made to decompose each other.
  Oxygen with carbureted hydrogen, bihydroguret of phosphorous, olefiant gas, sulphureted hydrogen, cyanogen, and ammonia.
  Hydrogen with carbonic acid, nitrous gas, nitrous oxide, and sulphurous acid.

Although these gases, when simply mixed, do not chemically combine, or act on each other, yet the mixtures, even independent of agitation, are homogeneous compounds, or the gases do not arrange themselves according to their gravities, but are all equally diffused throughout the mixtures, and when once mixed never afterwards separate. The bulk also, after mixture, is exactly equal to the sum of the bulks of the gases which have been mixed; or each gas occupies the same space as when separate; and the specific gravity of the mixture is exactly the mean of that of the gases mixed. Hence the mixture of these gases appears to be a species of combination, similar to that which takes place in mixing together vinegar and water, or similar liquids.

Vapours and gases unite in nearly the same manner as gases and gases; and this combination enables the vapour to sustain the pressure of the incumbent atmosphere, without being condensed, which it could not otherwise support. They are also retained together by a species of affinity, sufficient to cause their intimate and uniform mixture, but not strong enough to produce chemical combination.

2. Of the gaseous bodies which chemically unite when they are mixed, "some combine in all circumstances by mere mixture; others unite only in particular states."

TABLE *of the gases which unite by simple mixture, and of the products formed by the combinations.*

Names of gases.	*Products.*
Oxygen with nitrous gas	Nitrous acid. Nitric acid.
Ammoniacal gas with vapour	Liquid ammonia.
———— ———— muriatic acid	Muriate of ammonia.
———— ———— fluoboric acid	Fluoborate of ammonia
———— ———— carbonic acid	Carbonate of ammonia
———— ———— sulphurous acid	Sulphite of ammonia
———— ———— sulphureted hydrogen	Hydrosulphuret of ammonia.

The two first of these products are vapours, the third is a liquid, and the rest are solid bodies.

a. Oxygen and nitrous acid unite in two different proportions; or 100 volumes of oxygen gas is capable of uniting with 133, and also with 200 volumes of nitrous gas. The first proportions produce nitric acid, which, as nitrous gas is a compound of $66\frac{2}{3}$ volumes of azote, and $66\frac{2}{3}$ of oxygen, therefore, appears to be a compound of $166\frac{2}{3}$ volumes of oxygen combined with $66\frac{2}{3}$ of azote; the second produce nitrous acid, or nitric acid saturated with nitrous gas, which appears on the same principles to be a compound of 200 volumes of oxygen united to 100 of azote. It is, however, probable, that these gases will combine in different proportions from the above, and produce nitric acid, containing various proportions of nitrous gas in solution. The immediate effect of their combination is the formation of a yellow-coloured vapour.

b. Ammoniacal gas and *aqueous vapour* combine the moment they are brought into contact, and are condensed to a liquid; but the exact proportions are unknown.

c. Ammoniacal gas and *muriatic acid gas* unite when equal volumes of each are brought into contact; and the result of the mixture is a mutual condensation into a white powder, or muriate of ammonia. If 100 cubic inches of muriatic acid gas, therefore, weigh 59·80, and the same bulk of ammoniacal gas 18·67 grains troy, muriate of ammonia must be a compound of 3 parts of muriatic acid by weight, united to 1 part of ammonia.

d. Ammoniacal gas and *carbonic acid* unite in equal volumes, and condense into a solid salt, which is carbonate of ammonia. The combinations of this gas with the *fluoboric acid* are more varied, while with *sulphurous acid* and sulphureted hydrogen it also unites in equal volumes, and forms solid compounds.

TABLE *of gases which mix without chemically combining, but may be made to combine; and of the products formed by the combinations.*

Names of gases.	*Products.*
Oxygen with hydrogen	Water.
———— carbonic oxide	Carbonic acid.
———— azotic gas	Nitric acid.
———— muriatic acid	Oxymuriatic acid?
———— oxymuriatic acid	Hyperoxymuriatic acid?
———— sulphurous acid	Sulphuric acid.
———— nitrous oxide	Nitric acid.

a. The two first combinations may be effected by combustion, and the third by electricity. It has been supposed that the heat in these cases acts indirectly only, and produces the combination by forcibly expanding one portion of the gas, and thence producing a sudden compression in the neighbouring portions, so that some of the atoms of the two gases, being brought within the sphere of action of the attraction of affinity, combine; while the caloric evolved by this union occasioning the same expansion to be constantly renewed, the whole gaseous mixture is by degrees combined. This theory is confirmed by the experiments of Biot, which proved that oxygen and hydrogen gases can be made to combine by simple pressure.

b. The combination of *oxygen gas* with *muriatic* and *oxymuriatic acids* has been rendered at least problematical by the experiments of Sir H. Davy: but as the question is still *sub judice*, I have retained the old opinions.[1]

c. *Oxygen gas* and *sulphurous acid gas* probably combine when simply mixed together, but the fact has not been ascertained in a decisive manner. They undoubtedly combine in a red heat: it is, however, probable that the combination is not direct, but that a portion of the sulphur is first separated, and then enters into combustion.

All these gases suffer condensation when they combine. The following TABLE exhibits at one view the principal facts connected with their combinations.[2]

Constituent gases.	Proportions.	Specific gravity of each.	Compounds produced.	Calculated gravity of the compound.	Real specific gravity.	Bulk of the compound.	Condensation.
Oxygen - - - - - Hydrogen - - -	59·8 10·	0.675* 0.065	Steam.	0·287	0·700	41·	59·
Oxygen - - - - Carb. oxide - - -	31· 69·	1·103 0·956	Carbonic acid.	0·997	1·500	66·4	33·6
Oxygen - - - - Azote - - - -	70·23 29·77	1·103 0·978	Nitric acid.	1·062	2·427	43·7	56·3
Oxygen - - - - Sulphurous acid -	24·3 147·0	1·103 2·265	Sulphuric acid.	1·970			
Oxygen - - - - Nitrous oxide - -	175· 158·	1·103 1·603	Nitric acid.	1·292	2·427	53·	47·†
Oxygen - - - - Nitrous acid - -	78· 158·	1·103 1·603	Nitric acid.	1·394	2·427	57·4	42·6†

* The temperature at which the gravity in this case is taken is 212°; all the rest are taken at 60°.

† The condensation stated in these two columns is hypothetical.

TABLE *of the principal gases which mutually decompose each other when mixed together.*

Oxygen with ....Phosphureted hydrogen.
Oxymuriatic acid with ....Ammonia.
———————————— ....Phosphureted hydrogen.
———————————— ....Carbureted hydrogen.
———————————— ....Olefiant gas.
———————————— ....Sulphureted hydrogen.

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[1] I am the more induced to adhere to the old opinions, from the convincing proofs of their accuracy, which have been lately advanced by my friend Dr. Murray. Vide *Experiments on Muriatic Acid Gas, &c. Edinburgh Transactions*, 1818.

[2] This Table is copied from that drawn up by Dr. Thomson (*Syst. of Chemistry*, 4th edit. iii. 477.); but I have left out the columns relating to the combination of oxygen with the muriatic and oxymuriatic acids, for the reasons already stated.

Oxymuriatic acid with ....Nitrous gas.
Sulphureted hydrogen with ...Nitrous gas.
———————————— ...Sulphurous acid.

All these gases, except the oxygen and hydrogen, are compounds. The three first decompositions are attended with combustion.

a. Phosphureted hydrogen with *oxygen.* The first of these gases may be regarded as phosphorus dissolved in hydrogen; and consequently in that state which enables oxygen to act upon it at the ordinary temperature of the atmosphere. When the proportion of phosphorus is considerable, the combustion is extremely brilliant, and the caloric evolved is sufficient to set fire to the hydrogen. The products, when the combustion is incomplete, are water, phosphorous acid, and hypophosphorous acid; but when it is complete, they are water and phosphoric acid.

b. Oxymuriatic acid and *ammonia* when brought into contact, excite spontaneous combustion; but none of the azote, which forms one constituent of the ammonia, enters into combination with the oxygen.

c. Phosphureted hydrogen gas, when mixed with oxymuriatic gas, burns, and exhibits a lively combustion. Both the components of the first gas combine with the oxygen, affording as products water and phosphoric acid, while common muriatic acid is evolved.

d. Oxymuriatic acid gas, when mixed with the heavy inflammable gases, does not occasion combustion, but slow and imperceptible decomposition takes place; the constituents of each gas uniting with the oxygen, and forming products corresponding to those of combustion. With nitrous gas it is brought to the state of common muriatic acid; while the nitrous gas is converted into nitric acid. The requisite proportions, according to Humboldt[1], are equal bulks of each gas.

e. Sulphureted hydrogen gas and *nitrous gas* mixed together in a dry state suffer spontaneous decomposition, sulphur is deposited, and nitrous oxide, ammonia, and water, are produced.

TABLE *of gases which mix without spontaneous decomposition, but which may be made to decompose each other by peculiar treatment.*

Oxygen with sulphureted hydrogen.
———————— carbureted hydrogen.
———————— olefiant gas.

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[1] *Ann. de Chimie*, tome xxviii. p. 142.

Oxygen with vapour of ether.
—————————— alcohol.
Nitrous oxide with hydrogen.
—————————— phosphureted hydrogen.
—————————— sulphureted hydrogen.
—————————— carbonic oxide.
Nitrous oxide with carbureted hydrogen.
—————————— olefiant gas.
—————————— vapour of ether.
———————————————— alcohol.
—————————— sulphurous acid.
Nitric acid with hydrogen, and probably all the preceding combustible gases and vapours.
—————————— sulphurous acid.
Nitrous gas with hydrogen.
—————————— sulphurous acid.
Hydrogen with sulphurous acid.
—————————— carbonic acid.
Vapour of water with carbureted hydrogen.
—————————— olefiant gas.

Some of these decompositions are produced by combustion, and are instantaneous; others take place without combustion, and are consequently very slow.

Oxygen and *sulphureted hydrogen gases* when mixed together do not suffer any change; "but if the mixture be made to approach an ignited body, combustion immediately takes place, and the products vary according to the proportion of the gases mixed." In all cases a great proportion of the sulphur is deposited, and some sulphurous acid is formed, owing to the caloric evolved by the combustion of the hydrogen setting fire to a portion of the sulphur.

If *oxygen gas*, in a small proportion, and *carbureted hydrogen*, or *oxygen* and *olefiant gas*, be exploded together, charcoal is deposited, and water and carbonic acid produced; beside which an inflammable gas, named by Berthollet oxycarbureted hydrogen, remains, occupying more than double the space of the original gases. But if the proportion of oxygen be large, that is, twice the bulk of the carbureted hydrogen, and three times that of the olefiant gas, these two gases are completely consumed, and the products are water and carbonic acid.

The *vapours of ether* and of *alcohol*, detonate when certain proportions are mixed with common air, or rather with the oxygen it contains; and the products are carbonic acid and water: the quantity of the former being very considerable when the vapour fired is that of alcohol. If the proportion of the ethereal vapour be one cubic inch, which should weigh 0·7 grains, and that of the oxygen 6·8 inches weighing 2·3 grains, the products will be 4·6 inches of carbonic acid, and a portion of water, resulting from the union of the remaining 2·2 inches of oxygen with 0·10 of hydrogen.

The following TABLE *shows the quantity of oxygen necessary for decomposing* 100 *inches of each of the above gases.*

100 Measures of	Measures of oxygen.	100 Measures of	Measures of oxygen.
Sulphureted hydrogen	75	Vapour of ether	680
Carbureted hydrogen	200	——— alcohol	680[1]
Olefiant gas	200		

When 100 measures of *nitrous oxide* are mixed with 100 of *hydrogen*, and fired by the electric spark, a complete combustion of the hydrogen and decomposition of the nitrous oxide take place, and water and azote are produced. The superior affinity of the hydrogen over azote is in this case aided by the caloric evolved during the combustion of the former gas.

One measure of *phosphureted hydrogen*, and three measures of nitrous oxide, are completely decomposed when exploded by the electric spark, producing water and phosphoric acid, and leaving three measures of pure azote. In this case the proportion of nitrous oxide is sufficient to combine with both the components of the phosphureted hydrogen gas. In the same manner *sulphureted hydrogen gas* is acted on by *nitrous oxide*; and the products of the detonation are water, sulphuric acid, and azote.

When a mixture of *olefiant gas* and *nitrous oxide* is detonated, the products are modified by the quantity of the latter gas employed; when this is large, the constituents of the inflammable gas are both saturated with oxygen, and water, carbonic acid, and azote, are produced; but when a smaller proportion is used, an inflammable gas remains.

In all cases of the combustion of nitrous oxide with inflammable gases the phænomena are analogous to their combustion in oxygen; and the same is the case when mixtures of nitrous gas and the combustible gases are fired by being passed through a red-hot tube. Nitrous gas, however, does not detonate with, nor decompose any of the combustible gases which have been just considered; but when moist iron is placed in contact with nitrous gas, the hydrogen evolved by the decomposition of the water for the oxidizement of the iron, decomposes the nitrous gas, converting it into nitrous oxide, and forming ammonia.

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[1] *Thomson's Chemistry*, 4th edit. iii. 496.

The other cases of decomposition enumerated in the table are slowly produced by the continued action of elasticity, without any combustion taking place.

The combinations of gases with gases are not immediately effected for the purposes of Pharmacy, but several of them occur during many of the operations for the preparation of the saline and metallic compounds; and therefore require to be known and understood for comprehending the theory of these operations.

2. OF THE COMBINATION OF GASES WITH LIQUIDS.

Water is the only liquid the action of which upon the gases has been accurately examined. In its ordinary state it contains in solution a considerable portion of atmospheric air, which can be separated from it by boiling: and it is then capable of re-absorbing air, and any other gaseous fluid with which it may come in contact. All gases, however, are not equally absorbable; some being taken up in great quantity, and others only in a very small proportion.

TABLE *of gases which are but little absorbable by water, placed in the order of their absorption, beginning with the least absorbable.*

1. Azotic gas.
2. Hydrogen gas.
3. Arsenical hydrogen.
4. Carbureted hydrogen.
5. Carbonic oxide.
6. Phosphureted hydrogen.
7. Oxygen gas.
8. Nitrous gas.
9. Olefiant gas.
10. Nitrous oxide.
11. Carbonic acid.
12. Sulphureted hydrogen.

The quantity of any gas absorbed by water is very much increased by pressure; but by diminishing this pressure the gas again separates in its elastic form. Temperature also regulates the quantity, which diminishes as the temperature increases, owing to every additional increment of caloric augmenting the elasticity of the aëriform fluid. Thus Dr. Henry found that 100 inches of water at 55° absorbed 108 inches of carbonic acid, while at 85° it absorbed only 84 inches.

When water is pure, and the pressure and temperature the same, it then "absorbs a determinate quantity of every individual gas."

TABLE, *exhibiting the bulk of each of the foregoing gases absorbed by* 100 *cubic inches of water at* 60°, *according to the experiments of Mr. Dalton, Dr. Henry, and M. Saussure.*[1]

Names of Gases.	Bulk absorbed by 100 cubic inches of water.		
	DALTON.	HENRY.	SAUSSURE.
Carbonic acid	100	108	106
Sulphureted hydrogen	100	106	253
Nitrous oxide	100	86	76
Olefiant gas	12·5	—	15·3
Nitrous gas	3·7	5·	—
Oxygen gas	3·7	3·7	6·5
Phosphureted hydrogen	—	2·14	—
Carbureted hydrogen	3·7	1·4	5·1
Azotic gas	1·56	1·53	4·1
Hydrogen	1·56	1·61	4·6
Carbonic oxide	1·56	2·01	6·2

From this table, it appears that water absorbs its own bulk, or rather more, of the gases in the first compartment; one-eighth of its bulk of that in the second; one-twenty-seventh of those in the third, and one-sixty-fourth of those in the fourth; and the absorption is in the direct ratio of the densities of the gases.

With regard to pressure, water of the same temperature always takes up the *same bulk* of each gas, whatever be the density of the gas; and therefore, by increasing the pressure sufficiently, water may be made to absorb any quantity of gas. Thus, twice its bulk of carbonic acid will be absorbed under an additional pressure of 30 inches of mercury; three times its bulk under a pressure of 60 inches, and so on. A fact which has been applied to practice, in the manufacture of aërated soda-water, on a great scale. From this circumstance it would appear that the absorbed gas still retains its elasticity; yet it is probable that a chemical attraction is exerted between the particles of the water and those of the gas, and it is taken up until the repulsion between the particles of the absorbed gas just balances the affinity of the water for them. Owing, however, to the weak affinity exerted between the gas and the water, if a quantity of water fully impregnated with any gas, as carbonic acid, for example, be exposed to the atmosphere, or any other gaseous body, the greater part of the absorbed gas escapes from the water and mixes with the superincumbent air; and, therefore, to preserve the impregnation complete, the aërated water must be preserved in well-stopped bottles; or under an atmosphere of the same gas it contains.

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[1] *Thomson's Chemistry*, 5th edit. iii. 58.

Such are the principal circumstances connected with the absorption of the less absorbable gases: those which are more absorbable appear to belong to the class of *acids* and *alkalies*.

TABLE *of the very absorbable gases hitherto examined, placed in the inverse order of their absorbability, with the numbers of measures of each absorbed by one measure of pure water.*[1]

Names of gases.	*Measures absorbed.*
Oxymuriatic acid gas (chlorine)	2
Cyanogen	4½
Sulphurous acid	43·78
Fluosilic acid	363+
Muriatic acid	516
Fluoboric acid	700
Ammoniacal	780

The water when saturated with these gases undergoes an increase of bulk. The following table exhibits this change, supposing the original bulk to have been 1.[2]

Saturated with	*Cubic inches.*
Oxymuriatic acid gas (chlorine)	1·002+
Sulphurous acid	1·040
Fluosilic acid	——
Muriatic acid	1·500
Ammoniacal	1·666

The absorption of these gases is the consequence of the exertion of an affinity between them and water; but in every respect the circumstances attending it are exactly the same as those attending the absorption of the former class of gases; except that "most of the gases belonging to the first class experience an expansion when absorbed; while all those of the second undergo a condensation, their affinity for water being greater than their elasticity."

With regard to the absorption of gases by other liquids, scarcely any very decisive experiments have been made.

3. OF THE COMBINATION OF GASES WITH SOLIDS.

From the difference which exists between the constitutions of gases and solids, their combination appears to be opposed by the elasticity of the former and the cohesion of the latter; but, nevertheless, under proper circumstances, both the simple and the compound gases combine with solids.

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[1] *Thomson's Chemistry*, 5th edit. iii. 68.

[2] Ibid. 68.

The simple gases are *oxygen*, *hydrogen*, *azote*. Of these oxygen combines with all the known simple solids; hydrogen requires that the solids be brought into a fluid state before it combines with them; and azote combines with one solid only, which is carbon.

a. Oxygen gas unites with carbon in two proportions, and forms *carbonic acid*, and *carbonic oxide*, which are gaseous fluids. Experiment has demonstrated that carbonic acid is composed of 27·27 parts of carbon and 72·73 of oxygen: hence, according to the theory of Dalton, an atom of it must consist of two atoms of oxygen and one of carbon. *Carbonic oxide* is composed of 41 parts by weight of oxygen and 28 of carbon; or of one atom of oxygen and one of carbon. Oxygen combines with boron in one proportion only, forming boracic acid, which is a compound of one atom of boron and two atoms of oxygen, or 100 parts of boron and 228·57 of oxygen.

With phosphorus, oxygen unites in three proportions, and forms *hypophosphorous acid*, *phosphorous acid*, and *phosphoric acid*, which are all solid substances. The proportions of the constituents of these three compounds are the following: hypophosphorous acid consists of 100 of phosphorus and 66·6 of oxygen, or one atom of phosphorus and one of oxygen: phosphorous acid of 100 of phosphorus and 133·3 of oxygen, or of one atom of phosphorus and two of oxygen; and phosphoric acid of 100 of phosphorus and 200 of oxygen, or one atom of phosphorus and three of oxygen.

Oxygen combines with sulphur in the same manner, and forms *hyposulphurous acid*, *sulphurous acid*, and *sulphuric acid;* the first of which is supposed to be a solid, the second and third are gases. According to Dalton's theory, the constituents of hyposulphurous acid are one atom of sulphur and one of oxygen; or of 100 parts of sulphur and 50 of oxygen; one of sulphurous acid, one of sulphur and two of oxygen, or 100 of sulphur and 100 of oxygen: while sulphuric acid, which is found by experiment to be composed of 150 parts by weight of oxygen and 100 of sulphur, is formed by the union of one atom of sulphur to three atoms of oxygen. The oxygen in these compounds is much more loosely combined than in the preceding; and hence the greater facility with which they are decomposed by combustibles.

Oxygen unites readily with the *metals*, forming solid compounds. In them the oxygen is condensed, while the cohesion of the metallic particles is merely weakened, but not overcome.

It has been supposed that the metals combine with determinate proportions only of oxygen, that there are no intermediate combinations, and that in general there are only two degrees of metallic oxidizement. There is reason, however, to believe with Berthollet, that the proportions are indefinite from the commencement to the highest degree of oxidizement of which any metal is susceptible, or to complete saturation; and in cases where determinate proportions are observed, these are owing to peculiar circumstances, which limit the combination, and " which in general being uniform, give rise to an invariable proportion." Thus, if the oxidizement of a metal takes place at its melting point, or at its vaporific point, these being uniform, the oxide will consequently be so, or the same determinate proportion will be observed in the combination. The compounds formed by the combination of oxygen with the metals have a powerful action on the animal œconomy, and are consequently very important objects of pharmacy. In this state metals become, also, capable of combining with acids, and acquire still greater activity; and as the degree of oxidizement varies, so the combination of the oxide in these different states with the same acid forms compounds differing from each other, and exerting various degrees of medicinal power.

b. Hydrogen has a considerable affinity for the simple combustibles; but they do not combine unless the cohesive force, which keeps together the particles of the solid, be overcome, or the hydrogen be exhibited in a nascent state; and, therefore, it is chiefly by the decomposition of water that these combinations are effected. Owing to the great elasticity of hydrogen gas, all the known combinations of it with the simple combustibles, except one, are gases.

Hydrogen unites with *carbon* in three proportions, constituting *olefiant gas*, which is composed of one atom of carbon and one of hydrogen; *carbureted hydrogen*, composed of two atoms of hydrogen and one of carbon; and *ether*, composed of 6 atoms of hydrogen, 5 of carbon, and 1 of oxygen. The first is the most intimate compound of the three, and carbureted hydrogen the next; for neither of these is affected by a red heat; whereas ether is decomposed, and converted into olefiant gas, carbureted hydrogen, and charcoal.

" Sulphureted hydrogen is the most intimate of the combinations of *sulphur* and hydrogen. A red heat does not decompose it." It is commonly formed by the " decomposition of water by the compound agency of an acid and a metal united to sulphur." In this case no obstacle is raised to the combination of the hydrogen, which is nascent, by the attraction of cohesion, the sulphur being just separated from the metal.

The combination of hydrogen with *phosphorus* is also obtained by the decomposition of water, by boiling the phosphorus in a liquid alkali, which retains the phosphorus in a temperature sufficient for enabling it to effect the decomposition. The oxygen of the water unites with one portion of the phosphorus, and forms phosphoric acid; while at the same time the hydrogen unites with the other portion, and forms phosphureted hydrogen.

c. The combinations of *azotic gas* with the simple solid combustibles are not yet sufficiently understood, except its combination with carbon to form *cyanogen*[1], which is a compound of one atom of azote and two atoms of carbon.

The compound gases do not enter into many combinations with solids, if the salts, which the acid gases form with alkalies, earths, and metallic oxides, be excepted; and those formed by ammonia with the solid acids. In general they are rather decomposed. Thus, carbon, phosphorus, sulphur, and many metals decompose nitrous gas, nitric acid, and oxymuriatic acid; and sulphurous acid is decomposed by the metals.

Such are the effects of the combinations of solids, liquids, and gases. The knowledge of the laws which regulate them, and the results of the combinations, are of the utmost importance; the greater number of the operations of pharmacy consisting of the combination of substances, with a view either of obtaining compounds by their direct chemical union, or the products of chemical action resulting from their mutual decomposition.

SECTION III.

PHARMACEUTICAL OPERATIONS AND APPARATUS.

THE operations of pharmacy may be arranged under two classes: —

I. *Operations which are purely mechanical.*
II. *Operations which are performed by chemical powers and agents.*

The first are intended for determining the weight and bulk of bodies, diminishing their cohesion, and separating their integral parts: the second are intended for separating the elements of bodies from each other, and for reuniting these elements into new combinations.

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[1] This name was imposed upon this gaseous compound by Guy Lussac, who discovered it in 1815; and who found that, in combination with hydrogen, it forms Prussic acid, which he therefore named *hydrocyanic acid*. It may be obtained from exposing dry prussiate of mercury in a small retort to a moderate heat. It is a colourless, transparent, elastic fluid, with a strong, disagreeable odour, soluble in water and alcohol; and highly inflammable.

I. PHARMACEUTICAL OPERATIONS PURELY MECHANICAL.

a. *Of the means of determining the weight and bulk of bodies.*

In pharmaceutical processes it is essential that the quantities of the substances employed be accurately ascertained; and for this purpose beams with scales, and measures must be provided. Several sets of beams and scales are necessary: one set for large weights, from one pound to one hundred weight or more; another for weights not exceeding five pounds; and a third for small weights under two drachms. A good beam should remain in equilibrium, both by itself, and when the scales are suspended to each extremity: the largest set should be exact to within half a drachm; the second should be sensibly affected by two or three grains at most; and the smallest by the hundredth part of a grain. Apothecaries, however, seldom have beams of such accuracy, and, generally, those that they employ are much injured by exposure to acid fumes, and from want of cleanliness. To preserve the delicacy of beams they should be kept in very close cases, and not left suspended longer than is absolutely necessary; nor should they be overloaded.

Drugs are bought in the gross by *avoirdupois weight*, which is the standard of most articles of merchandize; but for the composition of medicines *troy weight* is directed to be used by the British Colleges. The following TABLE exhibits the manner in which the pound is divided, and the signs used in prescription for denotiong the different weights.

A pound (*libra*), ℔	contains	Twelve ounces.
An ounce (*uncia*), ℥		Eight drachms.
A drachm (*drachma*), ʒ		Three scruples.
A scruple (*scrupulus*), ℈		Twenty grains.
A grain (*grana*), gr.		————

The differences between the avoirdupois pound and the troy or apothecaries' pound, and their subdivisions, are exhibited in the following Tables.

Apothecaries' weight.

Pound.		*Ounces.*		*Drachms.*		*Scruples.*		*Grains.*
1	=	12	=	96	=	288	=	5760
		1	=	8	=	24	=	480
				1	=	3	=	60
						1	=	20[1]

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[1] Tables of the method of reducing the subdivisons of the troy pound into decimals of the troy pound are given in the Appendix to Part I.

Avoirdupois weight.

Pounds.		*Ounces.*		*Drachms.*		*Grains.*
1	=	16	=	256	=	7000
		1	=	16	=	437·5
				1	=	27·975

The troy weight has also been adopted by the Edinburgh College for apportioning liquids; but the London and Dublin Colleges with more propriety order liquids to be measured: and for this purpose the London College employs measures derived from the wine gallon, which is subdivided for medical purposes, in the manner exhibited by the following Table, which shows also the signs used for denoting the several measures.

A gallon (*congius*), cong.	contains	Eight pints.
A pint (*octarius*), O		Sixteen fluid ounces.
A fluid ounce (*fluid uncia*), f℥		Eight fluid drachms.
A fluid drachm (*fluid drachma*), fʒ		Sixty minims.
A minim (*minima*), ♏		———————

Table of the proportions of the wine gallon.

Gallon.		*Pints.*		*Fluid Ounces.*		*Fluid Drachms.*		*Minims.*
1	=	8	=	128	=	1024	=	61440
		1	=	16	=	128	=	7680
				1	=	8	=	480
						1	=	60

The London College have introduced the last measure as a substitute for the drop, the inaccuracy of which had been long experienced; as the fluidity and specific gravity of the liquid, the thickness of the lip of the phial, and even its degree of inclination, were all liable to vary its size: but by dividing the fluid drachm into sixty equal parts, a measure of bulk is obtained as constant and uniform as the grain weight employed for solids.

For measuring liquids graduated glass measures of different sizes are to be preferred; (PL. i. *fig.* 8, 9.) and for quantities under five minims a slender graduated glass tube, (PL. i. *fig.* 10.) open at both ends, is to be employed. When this tube is used, the graduated end is to be inserted into the liquid to be measured, down to the mark indicative of the quantity required; and the upper end being then closely covered by the finger, it is removed, retaining the proper quantity of liquid, which again drops from it on raising the finger from the upper end. In extemporaneous prescription the measures of a table-spoonful and a tea-spoonful are used when great accuracy is not required; the former being supposed to be equal to half a fluid ounce, the latter to a fluid drachm.

Elastic fluids or gases are also measured in glass jars, or tubes hermetically closed at one extremity, and graduated by inches with their decimals; but in ascertaining the bulk of gases, the temperature of the atmosphere, and its density at the time, as indicated by the thermometer and the barometer, must be attended to: for if the former be above or below 60°, the mean heat of the air, or if the mercury in the barometrical tube be under or above 30 inches, corrections must be made by calculation relative to the degrees of temperature and pressure. For the former, the observed column of air must be divided by 80 and the quotient multiplied by the degree of temperature above or below 60°. This correction is negative when the actual temperature is above the standard, and positive when below. For making the corrections with regard to pressure, see the table in the Appendix.

The SPECIFIC GRAVITY of bodies is also necessary to be known in many pharmaceutical processes; and as the effects of acids and alcohol depend on the degree of their concentration, a knowledge of their gravity enables this to be most correctly ascertained. The specific gravity of any substance is "the quotient of its absolute weight divided by its magnitude, or the weight of a determinate bulk of any body; and as a standard for this purpose, the weight of a determinate magnitude of distilled water has been generally assumed as [1] unity" It is seldom necessary to determine the specific gravity of solids; but for ascertaining that of fluids various means may be employed. If a little ball of rock crystal, for instance, suspended by a fine gold wire, be weighed first in air, and afterwards in distilled water, the weight lost by the ball is equal to the weight of an equal bulk of the liquid; so that by repeating this operation in other fluids, and dividing its loss of weight in any other liquid by its loss of weight in water, the quotient is the specific gravity of the particular liquid. The specific gravity of liquids,, however, is more generally determined by hydrometers, of which Mr. Nicholson's is by far the most accurate.[2]

The specific gravity of liquids is also very easily determined by the following simple method. Take a small light bottle which stands firmly, and holds about a fluid ounce or two of water, and stop its neck by a piece of barometer tube very accurately ground. First weigh the empty bottle and tube, then fill it with distilled water at 60° recently boiled, till the water rises a little into the bore of the tube, and weigh the whole, scratching the weight on the bottle, and also the weight of the empty bottle and tube. For facilitating calculation, the water should be brought to that height in the tube, at which its weight will be 500 grains, or 1000, or 1500 or 2000; and this height must be accurately marked on both sides of the tube with a file. By filling this bottle to the above mark with any other fluid, and weighing it, the specific gravity of that fluid is ascertained by only calculating how much lighter or heavier it is than the same bulk of water.[1]

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[1] *Lavoisier's Elements of Chemistry*, —Trans, 376.

[2] *Nicholson's Journal*, 4to. i. 110.

In ascertaining specific gravity the substances should be brought by calculation to the temperature of 55°, if the thermometer be above or below that point at the time of performing the experiments; and the gravities should always be expressed according to their relation to distilled water. Although this is the method generally employed in philosophical and pharmaceutical operations, yet it is necessary to observe, that the strength of spirits, according to the Excise laws in this country, is estimated by the proportion they contain of a standard spirit, termed hydrometer proof, which consists of 40 parts of pure alcohol and 51 of water. Clarke's hydrometer[2], which is the one employed by the Excise, loaded with the proper weights, sinks to the mark indicating *proof* in spirits of the specific gravity 0·920, at a temperature of 60°. The strength of spirits stronger than proof, or *over proof*, is ascertained by the bulk of water required to reduce a given bulk of the spirits to the specific gravity denominated proof, on Clarke's hydrometer; and the strength of weaker spirits, or *under proof*, is estimated by the quantity of water it would be necessary to abstract to bring the spirits up to proof. Thus, if 20 gallons of the spirit require the addition of one gallon of water to bring it to proof, the spirit is said to be *one* to *twenty over proof*; and if, from the same quantity of spirit, one gallon of water must be abstracted to bring it to proof, it is said to be *one* in *twenty under proof*; and so on.

b. *Of the mechanical division of bodies.*

The cohesion of solid bodies often opposes an obstacle to their immediate chemical combination with other substances, and their medicinal action in the stomach; and therefore the following preliminary mechanical operations are instituted for overcoming to a certain degree that power, and separating the integrant particles of bodies, or reducing them to the state of powder. These are denominated pulverization, trituration, levigation, and granulation.

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[1] *Aikin's Dictionary of Chemistry*, ii. — *Appendix*.

[2] This instrument consists of a thin copper ball, terminating above in a flat stem, and below in a knob or metallic button to keep it perpendicular. It swims in alcohol, and there is a mark on the stem, with a weight marked *proof*, which when placed on the stem, with weights to suit the temperature, sinks it till the mark on the stem is on a level with the surface of the liquid.

1. *Pulverization* is that process by which friable and brittle solid bodies are reduced to powder. It is generally performed in mortars by means of pestles. These are made of various materials, of brass, iron, marble, granite, glass, agate, and porcelain, or of Wedgewood's ware, according to the nature of the substances for the pulverization of which they are intended to be used; it being requisite that the materials of which pestles and mortars are made be such as to resist both mechanical force and the chemical action of the substances they contain.

Mortars are required to be of various sizes. The largest are usually made of cast-iron, fig. 1. pl. i. fitted with wooden covers, perforated to admit the pestle, but close enough to prevent the finer and lighter parts of the substances from flying off, and to defend the operator from disagreeable and noxious matters, such as aloes, ipeccuanha, &c.: or this may be more completely attained by tying closely round the mouth of the mortar, and round the stalk of the pestle, a large piece of leather, so pliable as to permit the free motion of the pestle. But, notwithstanding these guards, it is sometimes necessary for the operator to cover his mouth and nostrils with a wet cloth, and to stand with his back to a current of air, that the particles which rise may be carried from him, when very acrid friable matters, as euphorbium or Spanish-flies, for instance, are to be powdered. To lessen the labour, the pestle is often attached by a cord to the end of a flexible wooden beam, placed horizontally over the mortar, the elasticity of which elevates the pestle to the proper height after each stroke is made. For lighter purposes, brass and bell-metal mortars are sometimes used; but as, in the pulverization of every hard body, the mortar also is worn by the operation, these mortars are improper for pharmaceutical purposes; neither must marble or metallic mortars be used for acid substances. The most useful mortars for smaller articles are those of Wedgewood's ware, as they are smooth, hard, and resist the action of any chemical re-agent.

Of whatever materials mortars are made, they should be internally of the form of a hollow hemisphere, and their sides should have such a degree of inclination as to make the substances fall back to the bottom every time the pestle is lifted. The operation, however, is retarded when too great a portion of the ingredients falls under the pestle; hence a large quantity of any substance should not be put into the mortar at a time, and the finer parts should be from time to time removed.

Vegetable matters require to be dried before they can be pulverized; and wood, roots, and barks should be previously cut, chipped, or rasped. When roots are very fibrous, as those of ginger, for example, it is advisable to cut them diagonally, which prevents the powders from being full of hair-like filaments. Resins and gum resins, which soften in a moderate temperature, or in warm weather, should be powdered in cold weather, and only gently beaten to prevent them from running into a paste instead of forming a powder; and when the powdered substance is intended to be dissolved in any menstruum, except a pure alkali, the pulverization is much facilitated by mixing them with a portion of clean well washed white sand. The pulverization of camphor is assisted by the addition of a few drops of alcohol; sugar is the best addition to aromatic oily substances, as nutmegs, mace, &c.; and to the emulsive seeds some dry powder must be added, without which they cannot be reduced to powder. Metals which are scarcely brittle enough to be powdered, and yet are too soft to be filed, as zinc, for instance, "may be powdered while hot in a heated iron mortar, or may be rendered brittle by alloying them with a small quantity of mercury[1];" but as metals are not required to be reduced to the state of very fine powder for pharmaceutical purposes, these processes are seldom performed.

2. *Trituration* is intended to produce the same effect as pulverization, but in a greater degree. It is performed by a rotatory motion of the pestle, either in the common mortars of glass, agate, or Wedgewood's ware, or in flatter mortars made of the same materials. On a great scale, this operation is performed by means of large rollers of hard stone, which turn upon each other as in corn-mills, or by one vertical roller turning upon a flat stone. The fine powders kept in the shops are generally ground in this manner; but there appears to be an error in reducing vegetable matter to the state of impalpable powder, as in this state, both during the process of grinding and afterwards, the air and light act powerfully upon them, and produce changes, which, although they be not well understood, yet appear to alter the medicinal virtues of the substances.

3. *Levigation* is a process similar to trituration, except that the rubbing is assisted by the addition of a liquid in which the solid under operation is not soluble. Water or spirit of wine is usually employed, and occasionally viscid and fatty matters, as honey and lard. The substance to be levigated is spread

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[1] *Lavoisier's Chemistry*,—Trans. 437.

on a flat table of porphyry, or some other hard stone, pl. 1. fig. 4. and is then bruised and rubbed with a muller of the same materials, either of a pyramidal shape, as *a a*, fig. 4. pl. i. or a portion of a large sphere. A thin spatula of ivory, horn, wood, or iron, is employed to bring back the materials from the edges of the table, to which the operation of the muller continually drives them. Earths and some metallic substances are thus prepared.

4. *Granulation* is employed only for the mechanical division of metals and of phosphorus. It is performed by melting the substance, and either stirring it briskly till it is cold, or pouring it, in the melted state, into water, and stirring or agitating it till it cools. For the granulation of phosphorus the latter process only can be employed.

Substances are also reduced to the state of coarse powder by rasping and filing; and softer vegetable bodies are reduced to the state of pulp by means of the grater. Pl. i. fig. 6.

MECHANICAL SEPARATION.

The parts of substances, under certain circumstances, may be separated from each other by different mechanical means; as sifting, washing, or elutriation, filtration, expression, and despumation.

1. *Sifting*. The particles of the powders obtained by the longest and most accurate pulverization and trituration are still of very unequal degrees of fineness, and therefore require to be separated, the finer from the coarser, by the operation denominated sifting. The finer particles pass through the interstices of the sieves, which are made of iron-wire, or hair-cloth, or gauze, and leave the coarser to be again submitted to the pestle; and thus by degrees the whole is made to assume an uniform fineness. The simple sieve is a broad wooden hoop, with a cloth of one or other of the above textures stretched over it in the manner of the parchment of a drum: the compound sieve, which is more employed, consists of the simple sieve, with a deeper rim, pl. i. fig. 5. *c*; a lid *b* covered with leather; and a receiver *d*, with leather stretched across one end, and made sufficiently wide to admit the lower portion of the sieve to enter and fit tightly within it. When these are put together, the finest powders may be separated by them without any loss or inconvenience to the operator.

2. *Washing*, or *Elutriation*, is intended for separating the finer parts of powders prepared by trituration or levigation, which are not acted upon by water. The powdered substance is mixed with a large quantity of water, and briskly stirred so as to diffuse it pretty equally through the fluid, which retains the finer particles suspended for a short space of time, and

permits the coarser to settle to the bottom. The liquor thus impregnated is poured off from the sediment; and by allowing it to remain at rest for a sufficient length of time, it deposits the fine powder, from which the clear water is separated, either by carefully decanting it; or, if the sediment be very light, so as to be easily disturbed, by means of the glass syphon, pl. i. fig. 12. the longer limb of which being plunged into the vessel containing the fluid till it nearly touches the subsided powder, and the air sucked from it by means of the arm *h*, the whole of the supernatant fluid is drawn off, and the powder left in a fit state to be dried. The coarser particles first separated may be again levigated, and the elutriation repeated. Chalk and some metallic matters are thus prepared; and the process may likewise be employed for separating substances of different degrees of specific gravity, although of the same degree of fineness.

3. *Filtration* is intended for separating fluids from solid bodies partially suspended in them. Filters may be regarded as kinds of sieves; and are generally made either of very fine and close flannel, or linen, or of unsized paper formed into a conical shape, through which the liquid percolates clear, while the solid is collected at the apex of the cone, which is inverted. When the quantity of materials is large, and the solid is not in the state of very fine powder, nor very perfectly suspended in water, flannel or linen bags are to be preferred, as performing the process more quickly than paper. These are generally made in a conical shape, with the mouth stretched on a hoop or frame supported upon a wooden stand. When the solid residue is the part to be preserved, flannel filters may be used; but when the filtered liquor is the valuable product, linen is preferable, as it absorbs less of the fluid, which is also obtained in a more limpid state. The cloth must be well cleaned after each time it is used, to prevent any thing from remaining to injure subsequent operations. For smaller processes, unsized paper is the best material for forming filters. A square piece of this paper of a size proportionate to the quantity of the substance to be filtered is taken, and first doubled from corner to corner into a triangle, which by second doubling forms again a smaller triangle; and this when opened constitutes a paper cone, which is to be supported in a glass funnel, pl. i. fig. 11. before the liquor is poured into it.

Funnels are made of tin, or Wedgewood's ware, or glass, but the two latter only should be used in the laboratory. Those which are ribbed are preferable, as the paper adheres so closely to the sides of smooth funnels as nearly to prevent the filtration from proceeding, unless pieces of straw or thin glass rods be arranged round the inside, so as to form an unequal surface for the paper to rest upon.

In most instances the first portions of fluid that pass through a filter are turbid, and require to be poured back again into the filter, sometimes repeatedly until the pores are sufficiently obstructed to pass the most limpid part only of the liquor. In cases where the solid residue is small, and it is requisite to collect the whole of it, it is useful to have a small glass tube, drawn out to a fine capillary point at one extremity; by filling which with distilled water, and putting the larger end into the mouth, the force of the breath can direct a small strong stream of water round the sides of the paper in the funnel, which will wash down to its bottom all the minute particles of solid matter lodged on its sides.

The concentrated acids and alkaline solutions act too powerfully on the ordinary materials employed for filters, to be filtered in the common way; and therefore, when it is required that they should be filtered, which is not often the case, they are passed through strata of siliceous matter arranged in a glass funnel, in the following manner. An irregularly shaped pebble is first dropped into the throat of the funnel; then a layer of pieces of quartz, or broken flint-glass, is placed over it; and lastly, a thick stratum of coarsely powdered glass, or of well washed white sand, covers the whole. The substance to be filtered is poured gently on the surface of the sand, and soon passes through it and the substrata, leaving the impurities behind.

Expression is employed for obtaining the juices of fresh vegetables, and the unctuous vegetable oils. The subject is first bruised or coarsely ground, then inclosed in a hair-cloth bag, and subjected to violent pressure between the plates of a screw press. The bags should be nearly filled; and the pressure should be gentle at first, and gradually increased.

Vegetables in general, intended to be expressed, should be perfectly fresh; and should be submitted to the press as soon as they are bruised, as the bruising disposes them more readily to ferment: but subacid fruits yield more juice, and of a finer quality, when the bruised fruit is allowed to stand for some days in an earthen or wooden vessel. It is necessary to peel oranges and lemons before pressing them, to prevent the essential oil which their rind contains from mixing with the juice; and to some vegetables, which are not very juicy, the addition of a little water is requisite.

For expressing the unctuous seeds, in order to obtain the oil they contain, iron plates are employed; and the bruised seeds should be previously exposed in a bag to the steam of boiling water.

Despumation is employed to clarify fluids which are so thick and clammy as not to be able to penetrate through the substances of which filters are made, without some previous preparation. For this purpose it is sometimes required only to heat the liquor, which then throws up a scum that is to be carefully removed; but more frequently it is necessary to clarify it with the white of egg. When the substance is not spirituous, as syrups, for example, the albumen which is mixed with the fluid coagulates when it is boiled, and, entangling the impurities of the fluid, rises with them to its surface in the form of scum; but spirituous liquors may be clarified with isinglass without the assistance of heat, the alcohol coagulating the isinglass, which forms a scum, and descending to the bottom of the vessel, as in the former instance, carries with it all the impurities. Some expressed juices are clarified by the simple addition of any vegetable acid.

Besides the above methods of mechanically separating the parts of substances from each other, fluids of different specific gravities, mixed together, are separated by means of the separatory funnel, fig. 14. pl. i. It is chiefly used for separating the essential oils from the water they are entangled with during their distillation. The funnel is first stopped at the bottom, and then filled with the mixed fluids, the heaviest of which gradually subsides into the narrow part below; and when the cork at the bottom is taken out, and the stopper above a little loosened, it flows out; by which means the lighter is easily obtained in a separate state. Some of the essential oils are heavier, others lighter than water, but both can be thus separated with equal facility.

II. CHEMICAL OPERATIONS.

The operations of Pharmacy, which are strictly chemical, may be arranged in three classes.

a. Operations which produce chemical changes in bodies, separating the constituents, without any obvious decomposition.

b. Operations in which changes are produced by the chemical action of one set of bodies upon another, or attended with obvious decomposition.

c. Operations in which the oxygenizement and the disoxygenizement of bodies are effected by means of a very high temperature.

The changes produced by the operations arranged under the first class are effected,

1. By caloric - - - - -	Liquefaction.
	Fusion.
	Evaporation.
	Exsiccation.
	Distillation.
	Rectification.
	Dephlegmation.
	Sublimation.
2. By water - - - - -	Solution.
	Lixiviation.
	Maceration.
	Digestion.
	Infusion.
	Decoction.
	Extraction.
3. By other chemical agents	Coagulation.

1. *Liquefaction* is that operation by which certain bodies when exposed to a moderate heat melt, or are rendered fluid, after passing through several intermediate states of softness. Fat, lard, wax, resin, and many other similar bodies undergo liquefaction; which is therefore employed to facilitate the combination of these bodies in the formation of ointments. The vessels usually employed in the process of liquefaction are earthenware pans.

Fusion differs from liquefaction, in the sudden change from the solid to the fluid state which those bodies that are liable to it suffer on exposure to heat. There are no intermediate states of softness, but the fusible body, when heated to a certain point, immediately assumes the fluid form. This point differs very considerably in different solids; but in general simple substances are less fusible than compounds; and some of the simple earths cannot be fused without the addition of some other substances to promote their fusion. These are generally saline bodies, and are denominated *fluxes*.

Fusion may take place without changing the nature of the fused matter; but in general this operation is intended as a mean of promoting chemical action and of decomposing bodies. It is, however, generally confined to the metals, which are extracted from their ores; and afterwards moulded and alloyed by it. It is a species of operation seldom employed in pharmaceutical processes.

Fusion is usually performed in crucibles, the best of which are made of very pure clay, or potter's earth. Those formed of common clay with calcareous or siliceous earth are very fusible. The Hessian crucibles are composed of clay and sand, and when good, stand the fire very well; as do also Wedgewood's crucibles: but they are apt to crack when suddenly heated or cooled, — a circumstance, however, which may be remedied by using a double crucible, and filling the interstice with sand, or by coating the crucible with a paste of clay and sand. Crucibles formed of black lead resist very sudden changes of temperature; but they are destroyed if nitre be melted in them, and even a current of air acting upon them, whilst they are hot, destroys them. Crucibles are made of various forms, three-cornered or round, and fitted with covers, as represented pl. ii. fig. 4, 5. The lids may be luted on if necessary, with a mixture of clay and borax. Those crucibles, which are of a uniform thickness, have a reddish-brown colour, without black spots, and which have a clear sound when struck, are to be preferred.

In order to expose the lower part of a crucible to the utmost intensity of heat, and to prevent it from cracking by the draught of cold air which would be directed upon it, were it to be placed directly upon the grate of the furnace, it is usually raised upon a small stand, either solid or hollow, an inch above it, which, according to Dr. Kennedy, is the hottest part of the furnace.

Crucibles are also made of cast-iron, of fine silver, and of platina. The first, however, are destroyed when saline substances are melted in them, and when made red-hot in a current of air are apt to suffer oxidation: but in other respects they are durable, and can sustain sudden alternations of heat and cold without cracking. Some of the metallic crucibles combine many of the best qualities necessary for this set of instruments; particularly those of platina, which, however, are too expensive for ordinary use.

Evaporation is the dissipation of a liquid by means of heat, and is employed in pharmacy generally with the view of obtaining in a separate state any fixed substance which may be combined with water, or some other evaporable fluid. Thus, by exposing an aqueous solution of a salt to a certain degree of heat, the caloric which combines with the water renders it volatile, and disperses it in the form of an elastic aëriform fluid, while the particles of the salt being brought nearer to each other, and within the sphere of their mutual attraction, reunite, and the salt is obtained in its concrete state. This process differs from spontaneous evaporation, in which air is the principal agent, the liquid being diminished in quantity and dissipated in that fluid, independent of the action of caloric; whereas evaporation is not carried on by the air, nor even much accelerated by the exposure of a large surface, but only in proportion to the quantity of caloric which combines with the fluid, or the degree of heat at which the process is conducted. As the fluid which is dissipated is entirely lost, and sacrificed for the sake of the fixed substance with which it was combined, evaporation is only employed where the liquid is of little value, such as water; but where a solid is to be recovered from a more valuable liquid, as alcohol, for instance, the process of distillation is employed.

For small processes, very good evaporating dishes are made of the bottoms of broken retorts and matrasses, which may be cut smooth round the edges by means of a hot iron or ring, pl. iii. fig. 8. and thus converted into semiglobular[1] basins. The best evaporating dishes, however, are those of biscuit porcelain made by Wedgewood, and sold in assortments, the largest of which is capable of holding eight or ten pints. They are flat-bottomed, shallow vessels, with a lip in the upper edge, fig. 1. pl. iii. glazed in the inside; and thin, but of a dense hard texture. They will bear to be heated to the boiling point over a clear hot fire; but are apt to crack when a flame is allowed to play on them, or when the liquor is boiled to dryness, at the moment the last drop of fluid is expelled, unless the fire be much lowered.

It is preferable, however, when glass or earthenware vessels are employed, to apply the heat by the medium of sand; or, if a still more moderate heat be necessary, by means of boiling water, over which the evaporating dish is placed. The first is denominated a *sand-bath;* the second, a *water-bath:* but for processes on a large scale, shallow iron pots or leaden troughs are used, to which the fire is directly applied.

Exsiccation is a variety of evaporation, producing the expulsion of moisture from solid bodies by means of heat. It is generally employed for depriving salts of their water of crystallization. They are exposed to the action of a fire in an iron ladle or pot, or in a glass vessel; and after dissolving as they are heated, in the water they contain, or undergoing what is called the *watery fusion*, the water boils, and, evaporating, leaves the salt in the form of a dry mass. When the substances to be exsiccated are liable to decomposition in a temperature above 212°, as is the case with some of the compound oxides, the process must be conducted by the heat of a water-bath.

Distillation differs from evaporation only in the circumstance, that the vapour or volatile matter elevated is condensed in close vessels, and preserved. The mode of conducting the operation and the regulation of the heat differs according to the nature of the subsances operated on.

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[1] The iron ring for this purpose has a wooden handle. It is made red-hot in the fire, then put upon the matrass which is to be cut; and, when the glass is sufficiently heated, by throwing on it a little cold water, it will generally break exactly at the circle heated by the iron ring.

The simplest distilling apparatus, for smaller processes, is the retort and the receiver. The former consists of a nearly globular body, with a long, gradually tapering neck, which is bent nearly at a right angle with the body. This is the simplest kind of retort, fig. 3. pl. iv. and if the materials to be distilled be liquid, they should be poured into the body of the vessel by means of a very long funnel, which, by reaching completely into it, prevents any thing from trickling down the sides of the neck. In withdrawing it, it is necessary to keep it applied to the upper part of the retort, that the drop hanging from it may not touch the inside of the neck: for nicer purposes the tubulated retort is to be preferred, fig. 9. pl. iv. The bottom of either kind should be very thin, and of a uniform degree of thickness, so as to bear the sudden application of heat from an Argand lamp, or even from a naked fire. The receiver, fig. 9. pl. iv. *c.* should be larger than the retort, and of a globular form, so as to allow of a large surface for cooling the condensing vapour: and it may be either joined directly to the retort, by the neck of the latter passing into it, or by the intervention of a third piece, denominated an adopter; and in either case the joinings are usually protected by lutes. When the substance to be condensed is of a very volatile nature, as ether, for instance, the receiver must be artificially cooled below the temperature of the atmosphere, either by surrounding it with ice, or allowing water to trickle slowly over it, brought down from a trough placed above the receiver, by means of worsted threads: the constant evaporation which the water suffers on the surface of the receiver keeps it at the requisite degree of temperature for condensing the ether. Like the retort, the receiver may be also tubulated.

Sometimes, instead of the retort and receiver, the stoneware cucurbit, with its capital, fig. 10. pl. iv. or the glass alembic and capital, in one piece, are used. It is necessary, occasionally, to coat the retort, and the latter-mentioned vessels, with sand and clay, to enable them to sustain a high temperature, and the sudden alternations of heat and cold to which they are liable in common operations. By these kinds of apparatus, acids, and other substances which arise from chemical decompositions aided by heat, are distilled; and the process is named distillation *per latus:* but if the products be highly volatile, or of a gaseous nature, the pneumato-chemical apparatus, to be afterwards described, is required.

For the preparation of alcohol, and of distilled waters, the common still, fig. 1. pl. ii. is employed. It consists of two parts,—the boiler, and the head or capital. The boiler, which is the part to which the fire is applied, and contains the materials, is generally of a cylindrical shape, and may be sunk into a furnace, or immersed in a water-bath when the temperature requires to be nicely regulated. The *head* or *capital* is a large hollow globe, the upper part of which is drawn out into a tapering pipe, bent to a curve or arch, and terminating in the serpentine, or worm. These parts are generally made of copper; but the *worm* is a long pewter pipe of a decreasing diameter, which winds in a spiral direction obliquely through a deep tub filled with cold water. The body, head, and worm require to be luted together; but in general slips of paper dipped in flour paste, or pieces of wet bladder, are sufficient for this purpose. In this apparatus, the vapours are raised into the head, and thence pass into the worm, in which they are condensed, and issue in drops from the lower end of the pipe. By degrees the water in the refrigeratory becomes warm, and requires to be renewed: and hence the necessity of the tub being furnished with a stop-cock, by which the heated water may be drawn off without disturbing the apparatus. As in this species of distillation the vapour ascends before it is condensed, it is named distillation *per ascensum*.

In some cases, as in the distillation of some essential oils, the vapour instead of passing laterally, or ascending, is forced to descend. To produce this effect, a plate of tinned iron is fixed within any convenient vessel, so as to leave a space beneath it; and the materials to be distilled being laid upon this, they are covered by another plate accurately fitted to the sides of the vessel, and strong enough to support the fuel which is burnt upon it. By this means, the volatilized matter of the materials under the fire is forced into the lower cavity of the vessel, and there condensed. This mode of distilling is denominated distillation *per descensum*.

In many processes, a large proportion of the vapour which is extricated is incondensable; and unless there were some means by which these could escape, the apparatus would be burst in pieces. To prevent accidents, therefore, a small hole was generally left, either in the joinings of the vessels, or in the receiver, which could be kept shut, and occasionally opened when the quantity of confined vapour was supposed to be such as might endanger the rupture of the vessels. By this contrivance, however, much condensable vapour escaped, and a large proportion of the products of the distillation was necessarily lost. This defect of the old apparatus was firt attempted to be remedied by Glauber, whose hints were improved by

Woulfe, the inventor of the apparatus now commonly employed. It consists of a retort, generally tubulated, in which the materials are heated; a receiver, to detain any part of the product which is condensable by cold; and a bent tube, proceeding from the receiver to the bottom of a bottle; with two apertures, and about half full of water. Several bottles, however, are generally employed; and these, being placed side by side, are connected with each other by means of bent tubes, one limb of each proceeding from the top of the bottle immediately preceding, and the other plunging to the bottom of the liquid of the bottle next in order. The joinings of the apparatus are all made air-tight, except the opening of the last bottle furthest from the retort, so that any vapour which escapes must have passed through the liquid in the whole series of bottles, and left all its condensable matter before it can escape. One inconvenience, however, attends this apparatus when it contains no other parts than the above; which is, that after the distillation, as the retort cools, a vacuum is produced in it and the first receiver, which induces a suction or absorption from the other receivers through the bent tubes, and a retrograde motion of the liquid contained in them takes place through the whole apparatus; so that the products are mixed,—unless the operator is on the watch, to separate the retort and receiver, the moment the liquor begins to rise in the bent tube between the receiver and the first bottle. The best contrivance for remedying this defect is the tube of safety, invented by *Welter*, and represented in plate v. fig. 1. It is a bent tube with a bulb blown in that part of it which lies between the upper and lower flexure; and a small funnel at the top. This tube is sometimes used as a stopper to the tubulure of the retort, or to a separate opening in the receiver; or, as is represented in the plate, it is cemented into the tube passing from the receiver to the first bottle. When it is to be used, a little mercury is dropped into the funnel, so as to occupy the space of the tube which lies between the two lower flexures. The mercury excludes the external air during the distillation; but as soon as the vacuum is formed by the cooling of the vessels, the mercury is forced by the pressure of the atmosphere into the bulb; and not being in sufficient quantity to fill it, the external air passes by it in the bulb, and rushes into the apparatus; by which means the vacuum is filled up, and the absorption of the liquid prevented.

In chemical operations, when the gases which are separated during any process are to be preserved, the pneumatic trough, fig. 1. pl. v. is attached to Woulfe's apparatus. The construction of the trough differs according to the nature of the fluid with which it is to be filled. If water be employed, the trough may be made of stone ware, or of tinned iron well japanned, and of an oblong or a circular shape. It may be about 18 inches long, 14 broad, and 8 inches deep; with a shelf of the same materials, which should extend entirely across the trough, and have two small holes in it to convey the gas into inverted jars set upon it; and two larger holes to receive two bottle supporters. This trough should be nearly filled with water, and the jars intended to hold the gas should be also filled with the same liquid, and inverted; so that when placed upon the shelf, the water in the trough may ascend about half an inch up their sides, which enables them to retain either water or gas. If mercury be employed, which is essential when the gases to be extricated are absorbable by water, the trough may be made of some hard wood, as mahogany, or of marble. It is not required to be so large as the trough for water, and one part only need be sunk: the shelf should be on each side of this part which is called the well; and it is useful to have an iron or brass stem supporting a semicircular clip fastened into the substance of the trough, to support the jar when it is filled with mercury and inverted. By this apparatus any gases given out during distillation may be collected and preserved; but this is a circumstance in pharmaceutical operations which is attended to more with the view of guarding the operator against the effect of noxious gases, than of preserving gases for examination.

Rectification is the repeated distillation of any product obtained by distillation, when it is not perfectly pure. This second operation is carried on at a lower temperature, so that the more volatile parts only are raised, and pass over into the receiver, leaving the impurities behind. When the fluid is simply rendered stronger, as in the case of alcohol, by bringing over the spirit, and leaving behind the superfluous water, the operation is named *dephlegmation* or *concentration*. When the liquid is distilled off from any substance, the process is called *abstraction*; and *cohobation*, if the product be redistilled from the same materials, or from a fresh parcel of the same materials.

Sublimation is a species of distillation, in which the product of the volatilization is condensed in a solid form; but as this condensation takes place at a higher temperature than that of watery vapour, a much more simple apparatus is required. The process is conducted sometimes in a crucible, with a cone of paper or another crucible inverted over it, in which the product is condensed; and as in this case it is light and spongy, it was formerly denominated *flowers*. For other matters which are less volatile a cucurbit and capital, or a flask, or phial, are employed, and sunk about two-thirds in a sand-bath. The product in these cases is generally solid, and is denominated a *sublimate.*

2. *Of the operations by which chemical changes are produced in the forms of bodies by the action of water.*

When a solid body is thrown into a liquid and disappears, the transparency of the liquid remaining the same, the process is named *solution*; or *solution* is that operation by which the aggregation of a solid is overcome by a liquid, and a compound produced which retains the fluid form, is transparent, and perfectly homogeneous. The liquid is generally supposed to be the substance exerting the active power, and has therefore been called the *solvent* or *menstruum:* it separates the particles of the solid or *solvend* from each other, and permanently suspends them by the state of combination into which they enter; but the attraction, as was before stated, is reciprocal, both as it regards the solid and the fluid. In general, the solution of every solid in a liquid can be effected in a certain quantity only, or is limited; and when it is carried to its ultimate point, the liquid is said to be saturated. The solvent power, however, is not always limited; there being some instances in which a solid dissolves in a liquid in any proportion: thus gum and sugar dissolve in water in every proportion. The solvent power of a fluid diminishes as it approaches to saturation, and the solution consequently goes on more slowly; but by raising the temperature, it proceeds again more rapidly, and a much larger portion of the solid is taken up than could have been dissolved at a lower temperature. This effect of temperature, however, does not take place in every instance; muriate of soda, for example, and some other salts, being dissolved in nearly as great quantity by cold as by hot water. When an increase of temperature increases the solubility of bodies, a portion of the solid, taken up by a heated liquid, is retained in combination as long as the increased temperature exists, but separates again as the solution is cooled down to the temperature of the atmosphere, or lower; and when this is properly conducted, salts are obtained in regular forms, or crystallization takes place.

Although a liquid be saturated with one solid, yet it may be still capable of dissolving a portion of another, and even of a third when saturated with the second; until it be combined with, or hold in solution, three, four, or five different bodies at the same time. The liquid, indeed, in this case does not dissolve so large a portion of any of the substances; but sometimes, from the mutual affinities which the substances exert, the whole proportion of solid matter dissolved is very much increased.

The solution of saline bodies in water requires no particular apparatus; as it can be conducted equally well in phials, or jars, or basins, provided the materials of which they are composed be such as can resist the action of the solvend.

Lixiviation is a term applied to solution when the saline body consists of both soluble and insoluble ingredients. On a great scale it is generally performed in large tubs, or vats, having a hole near the bottom containing a wooden spigot and faucet. A layer of straw is placed at the bottom of the tub, over which the substance is spread, and covered by a cloth; after which hot or cold water, according as the salt is more or less soluble, is poured on. The water, which soon takes up some of the soluble parts of the saline body, is after a little while drawn off by the spigot; and a fresh portion is successively added and drawn off until the whole of the soluble matter be dissolved. The straw in this operation acts as a filter; and the cloth prevents the water from making a hollow in the ingredients when it is poured on, by which it might escape without acting on the whole of the ingredients.

In smaller operations lixiviation may be conducted in glass matrasses, and the *ley*, which is the name given to the impregnated liquor, filtered through paper in a glass funnel.

Maceration is that operation by which the soluble parts of substances, chiefly of a vegetable nature, are obtained in solution by keeping them immersed in cold water for a sufficient length of time. It is frequently employed as a preparation for infusion and decoction, which are always rendered more effective by the previous maceration of the materials.

Digestion is an operation similar to maceration, but the power of the fluid is aided by a gentle degree of heat. It is usually performed in a glass matrass, and the evaporation of the liquid impeded by stopping the mouth of the matrass slightly, with a plug of tow, or tying over it a piece of wet bladder perforated with small holes. When the menstruum is valuable, as alcohol, for instance, another matrass, with a smaller mouth, may be inverted over the former, and the joinings secured by a piece of wet bladder; or, what is perhaps preferable, a long open glass tube may be luted to the mouth of the matrass containing the materials. By these means, any part of the liquor which is resolved into steam by the heat, is condensed, and conveyed back upon the materials. The matrass may be heated either by a common fire, a water-bath, or a sand-bath; and when either of the latter are used, it should not be sunk deeper in the water, or the sand, than the portion that is filled. The process has been denominated *circulation*, when the condensed vapours are returned upon the ingredients.

Infusion is intended principally to extract the volatile and aromatic principles of vegetable substances, which would be dissipated by digestion or decoction; and also those parts of vegetables which are more readily soluble in water, as gum, sugar, extract, tannin, the salts, and part of the resin, from the insoluble parts. The water is poured boiling hot on the materials, sliced, or reduced to a coarse powder, and kept in a closely covered vessel until they are cold; when the infusion or liquor is decanted off for use. The best infusion-pots are of a globular form in the body, with the neck cylindrical, and having a very large lip or spout furnished with a grate, which should incline inwards towards the top, so as to retain the ingredients in decanting off the infusion. Infusions differ according to the length of time the water has stood on the materials, and the heat used. In some instances agitation is necessary. Infusions may be made in the cold; and these are in general more grateful, although weaker.

Decoction, or boiling, is intended to answer the same purposes as infusion; but in a more extended degree. The solvent power of the menstruum is increased by the degree of heat: hence the liquor is deeper coloured, and more loaded with the soluble principles of the vegetable. It is employed with advantage to extract the mucilaginous parts of plants, their bitterness, and several other of the vegetable principles. It is generally performed in slightly covered vessels; but when the menstruum is valuable, as alcohol for instance, the common still is used, in the body of which the decoction is prepared, while the vapours that would otherwise escape are condensed and preserved.

Decoction, however, is often a prejudicial mode of preparation, particularly for those vegetables the virtues of which depend wholly or in part on the essential oil, or other volatile principles they contain; and even some fixed principles, such as extractive, are injured by it. Thus, cinchona bark is rendered nearly inert by long decoction, particularly if atmospheric air be freely admitted; for in these instances the extractive is oxygenized, and becomes insoluble.

Extraction is the result of either infusion or decoction: if the liquor obtained by either of those processes be subjected to evaporation, the watery part is dissipated, and the part extracted by them is obtained in the solid form, and denominated an *extract.* The same objections may be urged against this species of preparation as were stated under *Decoction.*

All the forms of preparation in which water is the agent may be regarded as various modifications of solution. When alcohol or diluted spirits are employed as menstrua, the ingredients subjected to their action are generally macerated, and the filtered fluid, which is the product, is denominated a *tincture.*

3. *Changes produced by chemical agents.*

Under this division we have only to notice *Coagulation,* which is the conversion of a fluid into a solid more or less consistent. The means employed for this purpose are increase of temperature, or the addition of acids and runnets. The effect appears to arise from a new arrangement of particles produced by the affinity exerted between the solid particles contained in the fluid, and the coagulating substance.

b. *Of the* OPERATIONS *in which changes are produced by the chemical action of one set of bodies upon each other.*

Decomposition, which is the separation of bodies that were chemically combined, is produced in some cases by heat, or the introduction of caloric into a body in sufficient quantity to separate the particles from each other to a distance beyond the sphere of the attraction of affinity which held them in combination; but in the greater number of instances it is the result of a superior affinity, which, unless modified by bulk and other circumstances, breaks the weaker affinity that holds the principles of the substance about to be decomposed in union, and produces new compounds.

In pharmaceutical operations decomposition frequently occurs; and it is of the utmost importance, in extemporaneous prescription, to be acquainted with the circumstances which occasion it.

Dissolution is the appellation given to cases of solution accompanied with decomposition, or some alteration in the nature of the dissolved body. In general, the dissolution of a body is attended with considerable effervescence, owing to the extrication of gases; and therefore the operation requires to be performed in capacious vessels, to prevent the loss of the materials.

Precipitation is an operation also in which decomposition takes place, a solid substance being thrown down from a liquid in which it was held in solution, by the chemical action of another body which is added to it. The substance employed to produce the precipitation is denominated the *precipitant*; the substance which is separated by its action, the *precipitate*. Thus, if into a solution of sulphate of magnesia a solution of soda be dropped, the magnesia separates from the sulphuric acid, falls to the bottom, and forms the precipitate; while the alkali, which is the precipitant, combining with the acid, thus set free, remains in solution in the state of sulphate of soda. Sometimes, the precipitate is separated by the precipitant having a greater affinity for the liquid, and thence weakening its attraction to the substance which it held in solution. Alcohol, for example, when added to a saturated solution of sulphate of magnesia, precipitates the salt in a crystallized form, and combines with the separated water. At other times the precipitate is an insoluble compound formed by the union of the added substance with that which was previously held in solution; as, when a solution of barytes is added to a solution of sulphuric acid, sulphate of barytes is formed and precipitated. The mixture of a solution of a compound salt with the solution of another compound salt may produce a precipitate which is an insoluble compound, while a new soluble compound is formed at the same time and remains in solution; in which case the decomposition is produced by double elective attraction: thus, if a solution of superacetate of lead be added to a solution of sulphate of zinc, the oxide of lead leaves the acetic acid, and combining with the sulphuric, forms sulphate of lead, which is insoluble and falls to the bottom; while acetate of zinc, formed by the union of the oxide of zinc with the acetic acid, remains in solution.

When the precipitate is the chief object of the process, it is necessary to wash it after it is separated by filtration. This operation requires little attention when the substance thrown down is insoluble in water; but when it is in some degree soluble, attention is required to prevent the loss which might result from the use of too much water.

The best precipitating vessel is a very tall glass jar narrower at the bottom than at the mouth, so that the precipitate may readily collect by subsidence, and the supernatant liquor be decanted off with more ease, fig. 7. pl. iii.

Precipitation is intended to separate solids from solutions in which they are contained; to produce new combinations, which cannot readily be formed by the direct union of their constituents; and to purify solutions from precipitable impurities. A knowledge of those substances which produce precipitation is also of much importance, in extemporaneous prescription; to prevent the virtues of remedies from being destroyed by improper combinations. The following Tables of Precipitants are extracted from those drawn up by Dr. Thomson.[1]

1. ALKALIES.	PRECIPITANTS.
Potash	Tartaric acid, supertartrates.
Soda	0.
Ammonia	Fixed alkalies.[2]
2. ALKALINE EARTHS.	
Barytes	Sulphuric acid, sulphates.
Lime	Oxalic acid, oxalates.
Magnesia	Phosphoric acid, phosphate of soda.[3]
3. EARTHS PROPER.	
Alumina	Ammonia, hydrosulphuret of potash.
4. METALLIC OXIDES.	
Silver	Muriate of soda.
Mercury	Muriate of soda.
Copper	Iron.
Iron	Succinate of soda, benzoate of soda.
Lead	Sulphate of soda.
Zinc	0, alkaline carbonates?
Antimony	Water, hydrosulphuret of potash.
Arsenic	Nitrate of lead.
5. ACIDS.	
Sulphuric	Muriate of barytes.
Carbonic	Muriate of an alkaline earth.
Boracic	Sulphuric acid.
Nitric	0.
Acetic	0.
Benzoic	Muriatic acid.
Succinic	Sulphate of iron.
Oxalic	Muriate of lime.
Tartaric	Potash.
Citric	Acetate of lime.

In some cases, when decomposition is effected by the addition of another substance, the separated body is not precipitated, but rises to the surface, and is thence denominated a *cream:* thus, by the addition of any acid to a solution of soap, the alkali unites with the acid, while the oil is separated, and swims on the surface of the liquor.

Crystallization, although it can scarcely be regarded as a species of precipitation, yet is very nearly allied to it. We have already noticed the theory of the operation, and therefore it only remains to mention in this place the modes in which it is effected for pharmaceutical purposes.

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[1] *System of Chemistry*, 4th edit. iii. 664—671.

[2] In strict language, no precipitation takes place, but the fixed alkalies added to solutions containing ammonia render it perceptible by its odour.

[3] The precipitation of magnesia in this case is not direct; but to effect it a solution of carbonate of ammonia must first be added to the solution of magnesia; no precipitate will appear, but on adding phosphate of soda it falls down in an insoluble state, in combination with the phosphoric acid. Dr. Wollaston suggested this method.

For the crystallization of any substance, it is necessary that it should be in a state of fluidity, either by the agency of caloric or that of water.

Metals and other bodies, which are capable of being fused, crystallize if they be allowed to cool very slowly, and are left at the same time in a state of rest: but this species of crystallization is never required for pharmaceutical purposes.

Salts are obtained in a crystalline form by a proper management of their watery solutions. When the salt to be crystallized is considerably more soluble in hot than in cold water, it is only necessary to saturate hot water with the salt, and set it aside to cool; but this must be slowly effected, by covering the vessel with a cloth to prevent the access of cold air, and the too rapid consequent formation of a pellicle, which would produce an irregular mass, instead of well formed distinct crystals. Crystals thus formed generally contain a considerable proportion of water of crystallization. When the salt is not more soluble in hot than in cold water, crystals are obtained by evaporating the solution while hot, until a pellicle forms on its surface, when it is set aside to cool, during which the crystals form; and after they are separated the evaporation is repeated, and another crop obtained, till by a succession of evaporations the greater part of the salt contained in the solution is separated in the crystalline state.

The following method of obtaining very large and regular crystals has been pointed out by M. Leblanc.[1] The solution is first evaporated to such a consistency that it shall crystallize on cooling: when it is cold, the liquor is poured off from the mass of crystals which generally form at the bottom, and is put into a flat-bottomed vessel. In this, solitary crystals gradually form, the largest of which are to be picked out and placed in another flat-bottomed vessel at some distance from each other, and a quantity of liquid, obtained in the same way by evaporating a solution of the salt till it crystallizes on cooling, poured over them. The position of each crystal is now to be altered once a-day by means of a glass rod; for, when not turned, the face on which the crystal rests receives no increase of size. When they have gained considerably in magnitude the most regular are to be selected, and each of them put separately into a vessel filled with the same liquid, and turned as already described several times a day, until they attain the largest size which the species of crystal under treatment is capable of acquiring. It is, however, necessary to observe, that if the crystals be allowed to remain too long in one portion of the solution, the quantity of salt it contains becomes so much diminished, that the liquid re-acts upon the crystal, and partially dissolves it.

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[1] *Journal de Physique*, lv. 300.

If a crystallizable salt be perfectly pure, the whole of its solution may be crystallized; but if two or more salts exist in the same solution, after crystals have been obtained by several successive evaporations and coolings, the remaining portion of the fluid, although saturated with saline matter, yet refuses to crystallize, and is then denominated *mother water*.

The vessels best adapted for crystallization are large flat dishes of Wedgewood's ware, such as have been already described as proper for the evaporation of liquids. When the crystallization is to be conducted slowly in the heat of the atmosphere, with the free access of air, deeper vessels are required, that there may be a considerable body of liquid; by which means crystals of considerable size and very regular in figure are procured.

Crystallization is intended to obtain crystallizable substances in a pure state; and to separate them from each other by taking advantage of their different solubility at different temperatures.

FERMENTATIONS.

The constituents of vegetable matter, when separated from the living plant, and placed under certain circumstances, act upon each other, and a spontaneous decomposition takes place even at the ordinary temperature of the atmosphere. This process has been denominated *fermentation* by chemists, on account of the intestine motion with which it is accompanied: and as its phænomena and results vary according to the nature of the vegetable matter subjected to it, and the circumstances under which it occurs, the general process is divided into three species easily distinguished from each other. The 1st is named the *vinous fermentation* — of which the products are wine, beer, and other vinous fluids: the 2d, the *acetous fermentation*, which produces acetic acid or vinegar: and the 3d, the *putrefactive fermentation*, in which gases chiefly are produced, and ammonia.

Each of these is occasionally artificially produced for pharmaceutical purposes, and therefore requires to be described.

Vinous fermentation. All vegetable substances containing saccharine matter, and a peculiar glutinous principle analogous to the gluten of wheat, are susceptible of this fermentation. For its commencement, however, the presence of water, extract, and a small proportion of vegetable acid, with a certain increased temperature, is requisite. In juices in which these are present, the fermentation is spontaneous; but as *yeast* contains the peculiar gluten, and the other principles necessary for exciting the vinous fermentation in any sweet vegetable juice or decoction, it is frequently used for this purpose in the formation of beer and wines. Soon after yeast is added to these substances, or to *wort*[1], or to *must*[2], an intestine motion commences in the liquor, its temperature rises, it becomes turbid, and carbonic acid gas is extricated: but after some time the fermentation again gradually subsides, the scum which was formed during its continuance rises to the surface, or sinks to the bottom; the liquor becomes lighter, and instead of its sweet taste has acquired that peculiar taste and flavour which is denominated vinous. This process of fermentation is never employed in the laboratory for the preparation of vinous liquors, although these are articles of the materia medica: but the cataplasms, which are prepared from carrots and similar vegetables mixed with yeast, derive their virtues from the vinous fermentation into which they enter, extricating a large quantity of carbonic acid gas, which operates as a powerful antiseptic.

Acetous fermentation. All liquors prepared by the vinous fermentation are susceptible of the acetous when kept exposed to the air in a temperature between 70° and 90°. Under these circumstances the liquor gradually becomes thick, its temperature increases, and filaments are seen moving through it in every direction, an intestine motion being excited, accompanied with a hissing noise: but as this motion subsides, these filaments fall to the bottom or attach themselves to the sides of the vessel, the liquor becomes clear and transparent, and has acquired a very sharp acid taste, — in which state it is denominated vinegar, — and contains, besides the acetic acid and water, which are its principal components, mucus, malic acid, supertartrate of potash, and some other vegetable constituents.

Pure alcohol, even when diluted with water, is not susceptible of this fermentation, but it enters into it when united with other fermentable bodies: thence wine and vinous liquors, which contain, besides alcohol, sugar, and some mucilaginous and extractive matter, are employed for making vinegar. In this process the alcohol is supposed to be decomposed, and oxygen absorbed; carbonic acid is formed, but is retained in the liquor; and it is probable, as Dr. Murray has suggested, that the ferment affords nitrogen, which it is now ascertained, enters into the composition of acetic acid.[1]

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[1] Wort is an aqueous infusion of malt. It consists of saccharine matter, starch, gluten, tannin, and mucilage.

[2] Must is the expressed juice of the grape. It contains water, sugar, a peculiar matter, which changes into gluten by contact with the air, mucilage, supertartrate of potash, tartrate of lime, muriate of soda, and sulphate of potash.

Many vegetable infusions and decoctions undergo this fermentation in warm weather; and hence the necessity of making these every day during summer, as by the decomposition which takes place, their medicinal virtues are completely destroyed.

Putrefactive fermentation. Almost every vegetable substance, when kept in a moist place, in a temperature not under 45° nor above 70°, undergoes spontaneous decomposition, its solid structure is completely destroyed, and its ultimate principles entering into new combinations, escape in the gaseous or aëriform state, leaving behind a small quantity of earthy and metallic matter only, which the vegetable body contained.

This process, which is denominated the *putrefactive fermentation*, does not absolutely require the contact of air, but water in every case appears to be essential. Vegetable bodies, which are very soluble in water, suffer it most readily; the surface of the liquor becomes covered with a mould; various elastic fluids, in which ammonia and phosphureted hydrogen gas are often perceptible, with other matters which produce a fœtid odour, are extricated, and it is ultimately completely decomposed.

The knowledge of the circumstances which promote this species of spontaneous decomposition points out the necessity of preserving vegetable substances in perfectly dry places; and when they have a tendency to attract moisture, the exposing them in a free current of air to dissipate the humidity which they would otherwise absorb.

c. *Of the* OPERATIONS *in which oxidizement is effected by means of a high temperature.*

The degree of temperature at which these operations are conducted cannot generally be obtained from a common fire; and therefore, before describing the operations themselves, it is necessary to notice the nature of furnaces, which are instruments of the most universal use in pharmaceutical chemistry.

Furnaces differ in construction, according to the particular purposes for which they are chiefly intended; but the following essential parts are common to all furnaces. 1st, The body or fire-place for holding the fuel and the vessel containing the materials to be submitted to the action of heat. 2d, The chimney by which the heated air and the smoke escape. 3d, The ash-pit, into which the ashes fall, and through holes in the side of which fresh air is admitted to the burning fuel.

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[1] *System of Chemistry*, iv. 465.

In a well-constructed furnace, the whole of the air which enters the ash-pit passes through the body of the furnace, and supports the combustion, after which the residue being highly rarefied passes off by the chimney; on the due height of which, and the proper regulation of the access of atmospheric air from below, the strength of the combustion and consequently the heat produced altogether depend. The access of the air is generally regulated by registers; which, in portable and smaller furnaces, are iron plates pierced with many holes of different sizes, which are generally fitted with brass stoppers, so that according to the number of holes opened, a greater or smaller quantity of air is admitted to the burning fuel. The chimney should be narrower than the body of the furnace, and of such a length that it can be heated throughout by the rarefied air which ascends through it; for it is by producing in the chimney a column of air of much less specific gravity than a corresponding column of the external air, that fresh air is constantly forced through the body of the furnace from below, and a strong draught produced. If the chimney be too short, all the advantage to be derived from the above circumstance is not obtained; and if on the other hand it be too long, the air loses its heat before it reaches the summit, and impedes to a certain extent the ascent of the rarefied air. According to Macquer, when the internal diameter of the furnace is 12 or 15 inches, and that of the chimney 8 or 9, its height should be 18 or 20 feet.

Of whatever substance furnaces are made, unless they be fixed and built of fire bricks, they should be coated to prevent the radiation, and consequent loss of heat; and the best composition for this purpose is clay and sand. It is perhaps better, however, first to put a coating of charcoal and clay next to the sides of the furnace, as was recommended by Dr. Black, particularly if it be made of plate-iron. The proportions he recommended were one part by weight of fine clay and three parts of charcoal; which being reduced to powder, and kneaded together with water, the mass is to be divided into balls of a moderate size; and these being applied to the sides of the furnace, are to be beat strongly with the face of a broad hammer, until a general coating of about one inch and a half covers the inside of the furnace, and the cavity assumes an elliptical form.

The most convenient portable furnace is that which was contrived by Dr. Black. It consists of an oval iron case, about 22 inches in height, 20 inches in diameter in the length of the oval, and 15 inches across; and lined in the body with the coating already described. On the top is fixed an iron plate perforated with apertures; one large, intended to receive a sand-bath, a still, or similar apparatus; and the other smaller, to which an iron tube, which acts as a chimney, is to be fixed. At the bottom of the body of the furnace, directly under the larger aperture, the grate is fixed; and under it the ash-pit receives the body, resting on a strong ring that encircles it, at about half an inch deep. The ash-pit is furnished with a door which opens on hinges, intended for removing the ashes; and also a register to regulate the admission of air to the burning fuel. The register is a plate of iron perforated with six apertures, the size of which increases in a geometrical ratio; so that by taking out the plugs with which they are stopped, either one or more at a time, the supply of air, and of course the heat to be excited, can be regulated with great nicety. The fuel is introduced at the top; but there is a door also, occasionally, in the side of the body of the furnace, through which fuel can be supplied during the conducting of any process; although, unless it be made to shut very close, this door is a disadvantage, as it prevents the admission of the air from being so precisely regulated. This furnace may be used for a great variety of operations, and may be fitted with a dome for the purpose of throwing down the flame when it is to be used for fusing metals.

For small operations, and when a great heat is not required, a furnace may be constructed by simply inverting a large black-lead or a Hessian crucible over another which is perforated at the lower part, and is fitted with a moveable grate for supporting the fuel; or a sufficient heat for a great variety of small operations may be obtained from a lamp, on the principle of Argand's, with a double concentric wick, and having rings attached to a brass rod on which they slide, for supporting the retort or matrass at any height above the flame.

With regard to *fuels*, the best are undoubtedly charcoal and coak, or a mixture of these. The advantages of *charcoal* are its kindling readily, burning with a strong clear heat in a small draught, without running into slag, choking the grate, or melting the walls of the furnace; and owing to its containing only matter which is extremely combustible, the flues or chimneys never collect soot or other foulnesses. The chief objection to charcoal is its great expense. *Coak* is much less expensive; but as it contains a mixture of earths and metallic oxides, it is apt in an intense heat to run together into a tough cohesive slag, which adheres to the walls of the furnace, and to the sides of crucibles, choking up the grate, and of course preventing the proper draught for carrying on the combustion. These disadvantages, however, are remedied by mixing it with an equal bulk of charcoal; and these united form the best fuel when an intense heat is required.

The pharmaceutical operations (usually performed in furnaces) are—

Fusion.
Evaporation.
Distillation.
Sublimation.
The oxidizement of metals.
The deoxidizement or reduction of metals.

The four first of these have been already described.

Oxidizement of metals. This term signifies that process by which metals are converted into oxides, by absorbing oxygen from the air, when exposed to a certain degree of heat. The disengagement of the caloric and light which oxygen gas contains, by the solidification of the oxygen in the oxide, is scarcely perceptible when the operation is conducted in atmospherical air; but if the oxidizement takes place in oxygen gas, it is rapidly effected, and caloric and light are very evidently extricated. This mode, however, of oxidizing metals is employed in small experiments only; but in all the processes of the laboratory for procuring oxides by the aid of heat, common air yields the oxygen. The metal, if it be not volatile at the temperature required for its oxidizement, is exposed to the heat of the furnace in a flat dish of baked clay called a *roasting test*, and frequently stirred to present fresh surfaces to the air: but, if the metal be easily volatilized, as is the case with zinc, it is thrown by pieces, at separate intervals, into a deep crucible, so placed as to admit the air and allow of the additions being made. If mercury be the metal operated on, it is generally put into a flat-bottomed matrass with a very tall narrow neck, the mouth of which is left open, and which is placed in a sand-bath, and kept at a degree of heat nearly equal to the boiling point of the mercury, for several days; but it is perhaps better to use a retort with the bottom flattened, and the neck only slightly bent, that the globules of mercurial vapour may be condensed, and the metal fall back into the vessel.[1] In this process the atmospheric air furnishes the oxygen, which readily combines with the volatilized mercury, while the form of the apparatus is intended to permit a renewal of it constantly to take place, without allowing the escape of the mercurial vapour.

Deoxidizement of metals, or their reduction, is that process in which the oxygen of a metallic oxide is separated, and the metal recovers its metallic form and properties. It is seldom performed on a large scale in pharmacy; but in cases of metallic oxides having been taken into the stomach, and proving fatal, it is of importance, in ascertaining their nature, to be able to reduce them to the metallic state by means of the blow-pipe and lamp; an apparatus by which minute substances may be almost instantaneously heated to a great degree, and their natures discovered with much accuracy.

The most common blow-pipe is a tube of brass or iron, bent near one of its extremities, and drawn out sufficiently fine to keep up a constant stream of air when it is blown into by the mouth applied to the opposite end. This form of blow-pipe is liable to one inconvenience, from the condensation of the moisture of the breath, in the course of blowing; to remedy which, a hollow ball or bulb is made near the small end of the pipe; and to render it more portable, this is divided through the middle, and fitted with a screw so as to be put together when used. Small separate jet pipes, or caps, are frequently adapted to slip on the small extremity of the blow-pipe, by which means any size of bore may be had recourse to, as a larger and more moderate, or a smaller and more intense flame is required. The flame for blowing through is best obtained from a wax or tallow candle with a very large wick, which must be kept moderately short by snuffing it frequently, and it must also be turned a little aside from the pipe.

In using this apparatus with advantage and ease, a little practice is necessary. As the flame is often required to be kept up for several minutes, the respiration must be carried on through the nostrils without interruption, and the stress of blowing performed merely by the compression of the cheeks upon the air held in the mouth. In subjecting any substance to experiment, it is to be placed either on a piece of charcoal, or in a platina spoon. When charcoal is employed, a large, compact well-burnt piece should be chosen, and a small shallow hole scooped in it for receiving the substance to be heated. The flame of the candle or lamp is then to be directed upon this by means of the blow-pipe. The charcoal soon kindles round the hole, which is gradually enlarged; and the heat being thereby augmented and kept up uniformly round the substance, the charcoal aids by its chemical effect the reduction of it if an oxide, or its deoxidizement if a fixed acid. Carbonate of lead thus treated is converted into a globule of metallic lead; and the phosphates are partially reduced to phosphurets.

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[1] *Higgins's Minutes. Aikin's Dictionary*, ii. 73.

In many operations, much inconvenience arises in using the common blow-pipe from both the hands of the operator being engaged; and therefore a double pair of bellows, which is fixed below the table, and worked by the foot of the artist, has been invented for giving the blast. Means have also been contrived for producing the blast by a stream of oxygen gas, or of mixed gases, as of oxygen and hydrogen, which excite a much more intense heat than can be produced by any other method.[1] A very ingenious blow-pipe is that of Mr. Paul of Geneva, in which the flame is produced by vapour of alcohol. See fig. 6. pl. iii.

COATINGS, CEMENTS, AND LUTES.

In many chemical operations, although the nature of the substances require that glass vessels be used, yet, from the degree of heat to which they are exposed, these must be protected on the outside by a coating; and in all operations where the products are in any degree volatile, it is of importance that the joinings of the parts of the apparatus should be perfectly secured: hence the necessity of coatings and lutes: and cements are requisite for repairing flaws and cracks.

Coatings are applied to the insides of furnaces to prevent the too quick dissipation of the heat, and also to protect the iron and materials of which the furnace is made from being destroyed by the action of the fire. The coating used by Doctor Black has been already described; but another nearly as good may be formed, by coarsely grinding fragments of pottery, and mixing the powder with moist clay in sufficient quantity to allow it to be moulded when wet. To render it more tenacious, some fibrous matter is generally added to the mixture, such as chopped cow-dung; the proportion of which, as recommended by Baumé, may be one ounce to every five ounces of the mixture. This is to be applied in the manner already described.

The same kind of coating may be used for glass vessels which are to be exposed to a red heat. The following is the mode of applying it. After kneading the coating material, so as to render it very plastic, let it be spread out on a flat table, and lay the bottom of the retort in the middle of the mass; then turn up the edges of the cake, so as to bring it round the whole of the vessel, pressing it down in every part with the fingers till it applies uniformly and closely. The material may also be applied in the state of thick cream, by dipping the retort repeatedly into it; drying it after each immersion by turning it before the fire. The different layers of coating may be thus laid on very equally, from the thickness of $\frac{1}{4}$ to $\frac{1}{2}$ an inch; so as to make the retort like a strong earthen retort glazed in the inside; and as the coating agglutinates in a full red-heat, it will form an impenetrable covering which cannot be detached from the glass.

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[1] For descriptions of a blow-pipe invented by Mr. Newman, for this purpose, and improved by Dr. Clarke and others, see *Journ. of Science and the Arts*, vol. ii. p. 104. *Annals of Philosophy*, vol. viii. *passim*. *London Med. Repository*, vol. vi. p. 376. vol. vii. p. 21.

Cements and *Lutes* are formed of the same materials. They are generally composed of unctuous or resinous substances; mucilaginous or gelatinous substances; or of clay, lime, and similar materials capable of resisting a high degree of heat.

a. *Unctuous and resinous Lutes.*—These should be viscid, plastic, compact, and possess the power of resisting acrid vapours. The following are the best of this class.

1. Melt eight parts of bees-wax with one of turpentine, and according as it is required to be more or less consistent or pliable, add different proportions of any resinous substance. This lute adheres very closely to the glass, is not easily penetrated by acrid vapours, and is very manageable. It cannot bear a heat higher than 140°.[1]
2. Dissolve spermaceti, and when melted, while it is hot, throw into it bits of caoutchouc. This is an excellent lute where much heat is not required to be employed.
3. Take pure, dry, unbaked clay finely powdered, beat it for several hours with a heavy iron pestle in a brass mortar, dropping in slowly some boiled linseed oil; or, some amber varnish, prepared by melting yellow amber in an iron ladle, and mixing it with linseed oil. This lute can sustain a considerable degree of heat, is impenetrable by acids and spirituous liquors, and adheres very strongly to metallic or glass vessels previously rendered perfectly dry. As it softens in some degree, however, by heat, it is necessary to surround the luting with pieces of wet bladder, and to secure the whole by packthread firmly tied round both above and below the joint.[1] This lute improves by age. It should be kept in a covered pan in a cool cellar.
4. Glazier's putty, which is a composition of chalk and drying linseed oil, resembles very much the above lute in its qualities, and may be used as a substitute for it.

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[1] Lavoisier.

5. Take four parts of common resin, one of yellow wax, and one part of fine brick-dust; melt the two former together, and when they are melted stir in the brick-dust. This lute adheres with great firmness, and forms also a good cement for stopping cracks in glass vessels.
6. Six parts of clay, one part of iron filings, and enough of linseed oil to form them into a paste, make a good cement for stopping cracks in iron vessels intended to be strongly heated.
7. The following cement is recommended for joining together glass or steel. "Take of mastich five or six bits as big as peas, and dissolve them in as much alcohol as will render them liquid. In another vessel dissolve as much isinglass (previously soaked in water) in brandy or rum as will make two fluid ounces of a strong glue; warm it, and incorporate with it by rubbing, two or three small bits of galbanum or ammoniacum, and the mastich solution. Preserve the mixture in a well-stopped bottle, and gently warm it before use."[1]

b. *Mucilaginous and gelatinous Lutes* are adapted only for operations which do not require a high temperature, and in which very acrid vapours are not extricated. They are easily applied, are sufficiently adhesive, and can be readily removed, by simply moistening them with water.

1. Under this head may be mentioned the simple application of moistened bladder. To render it very adhesive, it should be soaked in tepid water, until it feels clammy to the touch; after which it contracts considerably as it dries, and adheres with a sufficient degree of force.
2. Linseed meal kneaded up with water to a sufficient consistence, and applied pretty thick over the joinings of the vessels, or almond meal treated in the same manner, form very convenient lutes, which dry and become firm in a very short time.
3. Flour paste spread upon slips of moistened paper forms a sufficiently good lute for many purposes.
4. Smear slips of linen on both sides with white of egg, then apply these neatly to the joinings of the vessels, and when applied shake loosely over them some finely powdered quicklime. This lute dries very quickly, is extremely hard, very cohesive, impervious to water, and impenetrable by most kinds of vapours.
5. Mix powdered plaster of Paris with white of egg, milk, glue, starch, or any mucilage, and apply it immediately.
6. Mix together equal parts of clay and lime, with about one-third of flour and white of egg.

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[1] *Aikin's Dictionary of Chemistry.*

7. Mix together equal parts of colcothar and lime, with white of egg.

All the cements containing lime and gelatinous substances become so very hard that they cannot be separated from glass vessels without the aid of a sharp knife and some force; and, therefore, they can scarcely be applied to very thin vessels. They will not confine very corrosive acid vapours for a great length of time; but are excellent lutes for preserving a complicated apparatus steadily united and air-tight; and they will bear nearly a red heat. They are also the most useful kind of cement for applying to any accidental crack or failure of a lute already on, although a stream of vapour may be bursting through at the time.[1]

c. *Earthy Lutes* are intended for operations which require a high temperature. The following are the best of this class.

1. Mix burnt gypsum, in powder, with water to the consistence of a thick cream, and apply it immediately. This forms a lute which sets as soon as it is applied, and is firm; but a slight blow will easily crack it.
2. Dissolve one ounce of borax in half a pint of boiling water, and add as much slacked lime as will make a paste. By using a smaller portion of lime, this lute forms an excellent glazing for earthen-ware retorts, over which it should be spread with a brush; but when dry, a coating of slacked lime and linseed oil, beaten till the mixture is plastic, should be laid over the whole of the lute.
3. A very valuable fire lute may be made of about one part of glass of borax, five parts of brick-dust, and five parts clay, finely powdered together, and mixed with a little water when used.
4. The same composition which has been already described as a proper coating for the inside of furnaces, is also an excellent earthy lute.

If the beak of a retort be too small to fit accurately to the neck of a receiver, the vacancy should be filled up, by introducing short pieces of soft wood or of cork; and if the disproportion be very considerable, a cork must be fitted to the neck of the receiver, and a circular hole made in it sufficient to admit the beak of the retort. The curved tubes of a Woulfe's apparatus, when not fitted accurately by grinding, may be also fixed by means of corks. After the parts are thus firmly joined, the luting must be neatly and closely applied over the junctures; and the whole covered with slips of wet bladder, or with linen spread with one or other of the above described cements. The application of the lutes, although apparently very simple, yet requires some management, lest the luting of one juncture should disturb another already luted, which is apt to happen when applying the fillets and ligatures.

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[1] *Aikin's Dictionary of Chemistry.*

APPENDIX TO PART I.

No. I.

TABLE OF FREEZING MIXTURES.

The following Tables were drawn up by Mr. Walker from actual experiments. They show the degree of cold, or the reduction of temperature, which may be obtained by the different combinations mentioned in the first column.

TABLE I.

FRIGORIFIC MIXTURES—*WITHOUT ICE.*

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Muriate of ammonia Nitrate of potash Water	5 5 16	From + 50° to + 10°	40
Muriate of ammonia Nitrate of potash Sulphate of soda Water	5 5 8 16	From + 50° to + 4°	46
Nitrate of ammonia Water	1 1	From + 50° to + 4°	46
Nitrate of ammonia Carbonate of soda Water	1 1 1	From + 50° to − 7°	57
Sulphate of soda Diluted nitric acid	3 2	From + 50° to − 3°	53
Sulphate of soda Muriate of ammonia Nitrate of potash Diluted nitric acid	6 4 2 4	From + 50° to − 10°	60
Sulphate of soda Nitrate of ammonia Diluted nitric acid	6 5 4	From + 50° to − 14°	64
Phosphate of soda Diluted nitric acid	9 4	From + 50° to − 12°	62
Phosphate of soda Nitrate of ammonia Diluted nitric acid	9 6 4	From + 50° to − 21°	71
Sulphate of soda Muriatic acid	8 5	From + 50° to − 0°	50
Sulphate of soda Diluted sulphuric acid	5 4	From + 50° to + 3°	47

N. B. If the materials are mixed at a warmer temperature than that expressed in the table, the effect will be proportionably greater; thus, if the most powerful of these mixtures be made when the air is + 85°, it will sink the thermometer to + 2°.

TABLE II.

FRIGORIFIC MIXTURES—*WITH ICE.*

Mixtures.	Parts.	Thermometer sinks.		Degree of cold produced.
Snow, or pounded ice Muriate of soda -	2 1	From any temperature	to − 5°	*
Snow, or pounded ice Muriate of soda - Muriate of ammonia	5 2 1		to − 12°	*
Snow, or pounded ice Muriate of soda - Muriate of ammonia Nitrate of potash -	24 10 5 5		to − 18°	*
Snow, or pounded ice Muriate of soda - Nitrate of ammonia	12 5 5		to − 25°	*
Snow - - - - Diluted sulphuric acid	3 2	From 32° to − 23°		55
Snow - - - - Muriatic acid - -	8 5	From + 32° to − 27°		59
Snow - - - - Diluted nitric acid -	7 4	From + 32° to − 30°		62
Snow - - - - Muriate of lime -	4 5	From + 32° to − 40°		72
Snow - - - - Cryst. muriate of lime	2 3	From + 32° to − 50°		82
Snow - - - - Potash - - - -	3 4	From + 32° to − 51°		83

N. B. The reason for the omissions in the last column of this table, is, the thermometer sinking in the mixtures to the degree mentioned in the preceding column, and never lower, whatever may be the temperature of the materials at mixing.

TABLE III.

COMBINATIONS OF FRIGORIFIC MIXTURES.

Mixtures.	Thermometer sinks.	Degree of cold produced.
Parts. Phosphate of soda - 5 Nitrate of ammonia 3 Diluted nitric acid - 4	From 0° to — 34°	34
Phosphate of soda - 3 Nitrate of ammonia 2 Diluted mixed acids 4	From — 34° to — 50°	16
Snow - - - - 8 Diluted sulphuric acid 3 } *Or* Diluted nitric acid 3 }	From — 10° to — 56°	46
Snow - - - - 3 Diluted nitric acid - 2	From 0° to — 46°	46
Snow - - - - 1 Diluted sulphuric acid 1	From 20° to — 60°	40
Snow - - - - 3 Muriate of lime - 4	From + 20° to — 48°	68
Snow - - - - 3 Muriate of lime - 4	From + 10° to — 54°	64
Snow - - - - 2 Muriate of lime 3	From — 15° to — 68°	53
Snow - - - - 1 Cryst. muriate of lime 2	From 0° to — 66°	66
Snow - - - - 1 Cryst. Muriate of lime 3	From — 40° to — 73°	33
Snow - - - - 1 Diluted sulphuric acid 10	From — 68° to — 91°	23

N. B. The materials in the first column are to be cooled, previously to mixing, to the temperature required, by mixtures taken from either of the preceding tables.

Nº II.

TABLES OF SIMPLE AFFINITY.

The following Tables were drawn up by Bergman, and additions made to them by others at different times. The substance, the attractions of which are to be shown, is placed at the head of a column, and the substances to which it has an attraction placed beneath, in the order of the forces of attraction.

Oxygen.

Carbon
Charcoal
Manganese
Zinc
Iron
Tin
Antimony
Hydrogen
Phosphorus
Sulphur
Arsenic
Nitrogen
Nickel
Cobalt
Copper
Bismuth
Caloric ?
Mercury
Silver
Arsenous acid
Nitric oxide
Gold
Platina
Carbonic oxide
Muriatic acid
White oxide of manganese
White oxide of lead

Oxygen.*

Titanium
Manganese
Zinc
Iron
Tin
Uranium
Molybdena
Tungsten
Cobalt
Antimony
Nickel
Arsenic
Chrome
Bismuth
Lead
Copper
Tellurium
Platina
Mercury
Silver
Gold

Carbon.

Oxygen
Iron
Hydrogen

Nitrogen.

Oxygen
Sulphur
Phosphorus
Hydrogen

Hydrogen.

Oxygen
Sulphur
Carbon
Phosphorus
Nitrogen

Sulphur.
Phosphorus.

Potash
Soda
Iron
Copper
Tin
Lead
Silver
Bismuth
Antimony
Mercury
Arsenic
Molybdena

Potash, Soda, and Ammonia.

Acids:
- Sulphuric
- Nitric
- Muriatic
- Phosphoric
- Fluoric
- Oxalic
- Tartaric
- Arsenic
- Succinic
- Citric
- Lactic
- Benzoic
- Sulphurous
- Acetic
- Mucic
- Boracic
- Nitrous
- Carbonic
- Prussic

Oil
Water
Sulphur

Barytes.

Acids:
- Sulphuric
- Oxalic
- Succinic
- Fluoric
- Phosphoric
- Mucic
- Nitric
- Muriatic
- Suberic
- Citric
- Tartaric
- Arsenic
- Lactic
- Benzoic
- Acetic
- Boracic
- Sulphurous
- Nitrous
- Carbonic
- Prussic

Sulphur
Phosphorus
Water
Fixed oils

Strontites.

Acids:
- Sulphuric
- Phosphoric
- Oxalic
- Tartaric
- Fluoric
- Nitric
- Muriatic
- Succinic
- Acetic
- Arsenic
- Boracic
- Carbonic

Water

Lime.

Acids:
- Oxalic
- Sulphuric
- Tartaric
- Succinic
- Phosphoric
- Mucic
- Nitric
- Muriatic
- Suberic

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* Vauquelin's Table of the affinity of the metals for oxygen, according to the difficulty with which their oxides are decomposed by heat.

TABLES OF SIMPLE AFFINITY—*continued.*

- *Acids:*
    - Fluoric
    - Arsenic
    - Lactic
    - Citric
    - Malic
    - Benzoic
    - Acetic
    - Boracic
    - Sulphurous
    - Nitrous
    - Carbonic
    - Prussic
- Sulphur
- Phosphorus
- Water
- Fixed oil

MAGNESIA.

- *Acids:*
    - Oxalic
    - Phosphoric
    - Sulphuric
    - Fluoric
    - Arsenic
    - Mucic
    - Succinic
    - Nitric
    - Muriatic
    - Tartaric
    - Citric
    - Malic
    - Lactic
    - Benzoic
    - Acetic
    - Boracic
    - Sulphurous
    - Nitrous
    - Carbonic
    - Prussic
- Sulphur

ALUMINA.

- *Acids:*
    - Sulphuric
    - Nitric
    - Muriatic
    - Oxalic
    - Arsenic
    - Fluoric
    - Tartaric
    - Succinic
- *Acids:*
    - Mucic
    - Citric
    - Phosphoric
    - Lactic
    - Benzoic
    - Acetic
    - Boracic
    - Sulphurous
    - Nitrous
    - Carbonic
    - Prussic

SILEX.

- Fluoric acid
- Potash

OXIDE OF PLATINA.
OXIDE OF GOLD.*

- *Acids:*
    - Gallic
    - Muriatic
    - Nitric
    - Sulphuric
    - Arsenic
    - Fluoric
    - Tartaric
    - Phosphoric
    - Oxalic
    - Citric
    - Acetic
    - Succinic
    - Prussic
    - Carbonic
- Ammonia

OXIDE OF SILVER.

- *Acids:*
    - Gallic
    - Muriatic
    - Oxalic
    - Sulphuric
    - Mucic
    - Phosphoric
    - Sulphurous
    - Nitric
    - Arsenic
    - Fluoric
    - Tartaric
    - Citric
- *Acids:*
    - Lactic
    - Succinic
    - Acetic
    - Prussic
    - Carbonic
- Ammonia

OXIDE OF MERCURY.

- *Acids:*
    - Gallic
    - Muriatic
    - Oxalic
    - Succinic
    - Arsenic
    - Phosphoric
    - Sulphuric
    - Mucic
    - Tartaric
    - Citric
    - Malic
    - Sulphurous
    - Nitric
    - Fluoric
    - Acetic
    - Benzoic
    - Boracic
    - Prussic
    - Carbonic

OXIDE OF LEAD.

- *Acids:*
    - Gallic
    - Sulphuric
    - Mucic
    - Oxalic
    - Arsenic
    - Tartaric
    - Phosphoric
    - Muriatic
    - Sulphurous
    - Suberic
    - Nitric
    - Fluoric
    - Citric
    - Malic
    - Succinic
    - Lactic
    - Acetic
    - Benzoic
    - Boracic
- *Acids:*
    - Prussic
    - Carbonic
- Fixed oils
- Ammonia

OXIDE OF COPPER.

- *Acids:*
    - Gallic
    - Oxalic
    - Tartaric
    - Muriatic
    - Sulphuric
    - Mucic
    - Nitric
    - Arsenic
    - Phosphoric
    - Succinic
    - Fluoric
    - Citric
    - Lactic
    - Acetic
    - Boracic
    - Prussic
    - Carbonic
- Fixed alkalies
- Ammonia
- Fixed oils

OXIDE OF ARSENIC.

- *Acids:*
    - Gallic
    - Muriatic
    - Oxalic
    - Sulphuric
    - Nitric
    - Tartaric
    - Phosphoric
    - Fluoric
    - Succinic
    - Citric
    - Acetic
    - Prussic
- Fixed alkalies
- Ammonia
- Fixed oils
- Water

OXIDE OF IRON.

- *Acids:*
    - Gallic

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* Omitting the oxalic, citric, succinic, and carbonic, and adding sulphureted hydrogen after ammonia.

TABLES OF SIMPLE AFFINITY—*continued.*

Acids:
Oxalic
Tartaric
Camphoric
Sulphuric
Mucic
Muriatic
Nitric
Phosphoric
Arsenic
Fluoric
Succinic
Citric
Lactic
Acetic
Boracic
Prussic
Carbonic

Oxide of Tin.

Acids:
Gallic
Muriatic
Sulphuric
Oxalic
Tartaric
Arsenic
Phosphoric
Nitric
Succinic
Fluoric
Mucic
Citric
Lactic
Acetic
Boracic
Prussic
Ammonia

Oxide of Zinc.

Acids:
Gallic
Oxalic
Sulphuric
Muriatic
Mucic
Nitric

Acids:
Tartaric
Phosphoric
Citric
Succinic
Fluoric
Arsenic
Lactic
Acetic
Boracic
Prussic
Carbonic
Fixed alkalies
Ammonia

Oxide of Antimony.

Acids:
Gallic
Muriatic
Benzoic
Oxalic
Sulphuric
Nitric
Tartaric
Mucic
Phosphoric
Citric
Succinic
Fluoric
Arsenic
Lactic
Acetic
Boracic
Prussic
Fixed Alkalies
Ammonia

Sulphuric Acid. Prussic.*

Barytes
Strontites
Potash
Soda
Lime
Magnesia
Ammonia
Glucine
Yttria
Alumine
Zircon
Metallic oxides

Sulphurous Acid. Succinic.†

Barytes
Lime
Potash
Soda
Strontites
Magnesia
Ammonia
Glucine
Alumina
Zircon
Metallic oxides

Phosphoric Acid. Carbonic.‡

Barytes
Strontites
Lime
Potash
Soda
Ammonia
Magnesia
Glucine
Alumina
Zircon
Metallic oxides
Silex

Phosphorous Acid.

Lime
Barytes
Strontites
Potash
Soda
Ammonia
Glucine
Alumine
Zircon
Metallic Oxides

Nitric Acid. Muriatic Acid.§

Barytes
Potash
Soda
Strontites
Lime
Magnesia
Ammonia
Glucine
Alumina
Zircon
Metallic Oxides

Fluoric Acid. Boracic Acid ||. Arsenic Acid ¶ Tungstic Acid.

Lime
Barytes
Strontites
Magnesia
Potash
Soda
Ammonia
Glucine
Alumina
Zircon
Silex

Acetic Acid. Lactic Acid. Suberic Acid.**

Barytes
Potash
Soda
Strontites
Lime
Ammonia
Magnesia††
Metallic Oxides
Glucine
Alumina
Zircon

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* With the omission of all after ammonia.

† Ammonia should come before magnesia; and strontites, glucine, and zircon be omitted.

‡ Magnesia should stand above ammonia, and alumina and silica be omitted.

§ Ammonia should stand above magnesia.

|| Silex should be omitted, and water and alcohol inserted.

¶ Except silex.

** With the omission of strontites, metallic oxides, glucine, and zircon.

†† Magnesia should stand above ammonia.

TABLES OF SIMPLE AFFINITY—*continued.*

OXALIC ACID.
TARTARIC ACID.
CITRIC ACID.*

Lime
Barytes
Strontites
Magnesia
Potash
Soda
Ammonia
Alumina
Metallic oxides
Water
Alcohol

BENZOIC ACID.

White oxide of arsenic
Potash
Soda
Ammonia
Barytes
Lime
Magnesia
Alumina

CAMPHORIC ACID.

Lime
Potash
Soda
Barytes
Ammonia
Alumina
Magnesia

FIXED OILS.

Lime
Barytes
Potash
Soda
Magnesia
Oxide of mercury
Metallic oxides
Alumina

ALCOHOL.

Water
Ether
Volatile oil
Alkaline sulphurets

SULPHURETED HYDROGEN.

Barytes
Potash
Soda
Lime
Ammonia
Magnesia
Zircon

N° III.

TABLES *of the specific gravities of substances, which are articles of the Materia Medica, at a temperature of* 60° *of Fahrenheit.*

METALS and INFLAMMABLES.

Mercury	13·568
Sulphuret of mercury	10·000
Lead	11·352
Silver	10·510
Bismuth	9·822
Copper	8·895
Arsenic	8·310
Sulphuret of arsenic (red)	3·225
———————(yellow)	5·315
Iron	7·788
Sulphuret of iron	4·518
Tin	7·299
Zinc	6·861
Manganese	6·850
Antimony	6·712
Sulphuret of antimony	4·368
Sulphur	1·990
Charcoals	0·223 to 1·526
Bitumens	0·892 to 1·357

SALINE SUBSTANCES.

Sulphuric acid	1·885
Nitric acid	1·583
Muriatic	1·929
Acetic	1·080
Vinegar	1·0135 to 1·0251
Distilled vinegar	1·007 to 1·0095
Citric acid	1·0345
Benzoic	0·667
Ammonia (liquid)	0·9054
Potash	1·7085
Soda	1·336
Lime	2·3908
Magnesia	2·3298
Barytes	4·000
Alumina	2·000
Sulphate of potash	2·298
———————— soda	2·246
———————— magnesia	1·6603
Alum	1·719
Nitrate of potash	1·933
Muriate of soda	2·120
———————— ammonia	1·453
———————— lime	1·76
Muriate of barytes	2·8257
Phosphate of soda	1·338
Acetate of potash	2·1—?
Tartrate of potash	1·5567

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* Zircon after alumina.

Tartrate of potash & soda	1·757
Supertartrate of potash	1·953
Carbonate of potash	2·012
———— soda	1·421
———— ammonia	0·966
———— lime	2·7—
———— magnesia	0·2941
———— barytes	4·331
Sub-borate of soda	1·720

METALLIC SALTS.

Mercury, corrosive muriate of	5·1398
———— mild muriate	7·1758
———— subsulphate	6·444
Copper, sulphate of	2·1943
——— acetate	1·779
Iron, sulphate of	1·880
—— carbonate	3·333
—— acetate	1·368
Lead, carbonate of	7·2357
—— superacetate	2·345
Zinc, sulphate of	1·912

VEGETABLE SUBSTANCES AND PRODUCTIONS.

Cinchona bark	0·7840
Logwood	0·9130
Madder root	0·7650
Mahogany	1·0630
Red saunders	1·1280
Sassafras	0·4820
Gum arabic	1·5153
Hepatic alöes	1·3586
Socotorine alöes	1·3796
Amber (yellow)	1·0780
Ammoniacum	1·2071
Assafœtida	1·3275
Benzoin	1·0924
Camphor	0·9887
Catechu	1·4573
Elemi	1·0682
Euphorbium	1·1244
Galbanum	1·2120
Galipot	1·0819
Gamboge	1·2216
Honey	1·1390
Myrrh	1·3600
Olibanum	1·1732
Opium	1·3365
Opoponax	1·6226
Resin (common)	1·0727
Sagapenum	1·2008
Scammony (Aleppo)	1·2354
———— (Smyrna)	1·2743
Storax	1·1098
Sugar (refined)	1·6060
Tragacanth	1·8161
Turpentine	0·991
Wax (yellow)	0·9648
—— (white)	0·9686

FATS AND OILS.

Fat of beef	0·9232
—— mutton	0·9235
—— pork	0·9368
Tallow	0·9419
Butter	0·9423
Spermaceti	0·9433
Oil of linseed	0·9403
—— olives	0·9153
—— almonds	0·9170
Naphtha	0·8475
Oil of cinnamon	1·044
—— cloves	1·036
—— lavender	1·894
—— mint	0·8982
—— rosemary	0·9057
—— chamomile	0·8943
—— savine	0·9294
—— carraway	0·9049
—— anniseed	0·9867
—— juniper	0·8577
—— turpentine	0·8697
—— amber	0·8867
Sulphuric ether	0·632
Nitric ether	0·9088
Alcohol	0·794
Proof spirit	0·916

Water (distilled)	1·000

Nº IV.

RULES *for reducing the volume of Gases to a mean height of the Barometer, and mean Temperature.*[1]

1. *From the space occupied by any quantity of gas under an observed degree of pressure, to infer what its volume would be under the mean height of the barometer, taking this at 30 inches.*

This is done by the rule of proportion; for, as the mean height is to the observed height, so is the observed volume to the volume required. For example, if we wish to know what space would be filled, under a pressure of 30 inches of mercury, by a quantity of gas, which fills 100 inches, when the barometer is at 29 inches.

30 : 29 :: 100 : 96·66.

The 100 inches would, therefore, be reduced to 96·66.

2. *To estimate what would be the volume of a portion of gas, if brought to the temperature of 60º Fahrenheit.*

Divide the whole quantity of gas by 480; the quotient will show the amount of its expansion or contraction by each degree of Fahrenheit's thermometer. Multiply this by the number of degrees which the gas exceeds, or falls below 60°. If the temperature of the gas be above 60°, subtract, or if below 60° add the product to the absolute quantity of gas; and the remainder in the first case, or sum in the second, will be the answer. Thus, to find what space 100 cubic inches of gas at 50° would occupy if raised to 60°, divide 100 by 480; the quotient 0·208 multiplied by 10 gives 2·08, which added to 100 gives 102·08, the answer required. If the temperature had been 70°, and we had wished to know the volume, which the gas would have occupied at 60°, the same number 2·08 must have been subtracted from 100, and 97·92 would have been the answer.

3. *In some cases it is necessary to make a double correction, or to bring the gas to a mean both of the barometer and thermometer.*

We must then first correct the temperature, and afterwards the pressure. Thus to know what space 100 inches of gas at 70° Fah., 29 inches barometer, would fill at 60° Fah., and 30 inches barometer, we first reduce to 100 inches, by the second process, to 97·92. Then, by the first

30 : 29 :: 97·92 :: 94·63.

Or 100 inches thus corrected, would be only 94·63.

4. *To ascertain what would be the absolute weight of a given column of gas at a mean temperature, from the known weight of an equal volume at any other temperature.* First find by the second process what would be its bulk at a mean temperature; and then say, as the corrected bulk is to the actual weight, so is the observed bulk to the number required. Thus if we have 100 cubic inches of gas weighing 50 grains at 50° Fah., if the temperature were raised to 60°, they would expand to 102·08. And

102·08 : 50 :: 100 : 49.

Therefore 100 inches of the same gas at 60° would weigh 49 grains.

5. *To learn the absolute weight of a given volume of gas under a mean pressure, from its known weight under an observed pressure*, say, as the observed pressure is to the mean pressure, so is the observed weight to the corrected weight. For example, having 100 inches of gas which weigh 50 grains under a pressure of 29 inches, to know what 100 inches of the same gas would weigh, the barometer being 30 inches,

29 : 30 :: 50 : 51·72.

Then 100 inches of the same gas, under 30 inches pressure, would weigh 51·72 grains.

6. In some cases it is necessary to combine the two last calculations. Thus, if 100 inches of gas at 50° Fah., and under 29 inches pressure, weigh 50 grains, to find what would be the weight of 100 inches at 60° Fah., and under 30 inches of the barometer, first correct the temperature, which reduces the weight to 49 grains. Then,

29 : 30 :: 49 : 50·7.

100 inches, therefore, would weigh 50·7 grains.

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[1] Vide *Henry's Elements of Experimental Chemistry*, vol. ii. p. 497.

N° V.

TABLES *of the correspondence between measures of weight and capacity; according to the estimations given by Sir George Shuckburgh Evelyn, in vol. 88. of the Phil. Trans. corrected by Mr. Fletcher, in the 4th Vol. of the Philosophical Journal*[1].

TABLE I.

For converting Cubic Inches of Water (at 60 Therm. and 29·5 Bar.) into their equivalents in Troy weight.

Cubic Inch of Water		*Troy grs.*	*oz.*	*drachm*	*grs.*
1	weighs	252·506	0	4	12·506
2		505·012	1	0	25·012
3		757·518	1	4	37·518
4		1010·024	2	0	50·024
5		1262·530	2	5	2·530
6		1515·036	3	1	15·036
7		1767·542	3	5	27·542
8		2020·048	4	1	40·048
9		2272·554	4	5	52·554
1728 (1 cub. foot)		——	909	0	10·368

TABLE II.

For converting Troy Grains, Drachms, Ounces, and Pounds of Water into their equivalent Cubic Inches.

Grains.	*Cubic Inch.*	*Drachm.*	*Cubic Inch.*
1	·00396	1	·237618
2	·00792	2	·475236
3	·01188	3	·712854
4	·01584	4	·950472
5	·01980	5	1·188090
6	·02376	6	1·425708
7	·02772	7	1·663326
8	·03168		
9	·03564		

Ounce.	*Cubic Inch.*	*Pound.*	*Cubic Inch.*
1	1·900945	1	22·81134
2	3·801890	2	45·62268
3	5·702835	3	68·43402
4	7·603780	4	91·24536
5	9·504725	5	114·05670
6	11·405670	6	136·86804
7	13·306615	7	159·67938
8	15·207560	8	182·49072
9	17·108505	9	205·30206
10	19·009450		
11	20·910395		

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[1] Not having the fourth Volume of the Philosophical Journal by us, we have copied these Tables from the Appendix of Aikin's Dictionary.

TABLE III.

For converting Wine Pints of Water into their equivalent Troy and Avoirdupois Pounds.

Wine Pints.		*lbs. Troy.*		*lbs.*		*oz.*		*dr.*		*grs.*		*lbs. Averdup.*
1	=	1·26581783	=	1	:	3	:	1	:	31·1	=	1·04158725
2	=	2·53163566	=	2	:	6	:	3	:	2·2	=	2·08317450
3	=	3·79745349	=	3	:	9	:	4	:	33·3	=	3·12476175
4	=	5·06327132	=	5	:	0	:	6	:	4·4	=	4·16634900
5	=	6·32908915	=	6	:	3	:	7	:	35·5	=	5·20793625
6	=	7·59490698	=	7	:	7	:	1	:	6·6	=	6·24952350
7	=	8·86072481	=	8	:	10	:	2	:	37·7	=	7·29111075
8	=	10·12654264	=	10	:	1	:	4	:	8·8	=	8·33269800
9	=	11·39236047	=	11	:	4	:	5	:	39·9	=	9·37428525

TABLE IV.

For converting Troy Pounds of Water into their equivalent Wine Pints.

Troy Pound.		*Wine Pints.*	*Troy Pounds.*		*Wine Pints.*
1	=	0·7900031	6	=	4·7400186
2	=	1·5800062	7	=	5·5300217
3	=	2·3700093	8	=	6·3200248
4	=	3·1600124	9	=	7·1100279
5	=	3·9500155			

TABLE V.

For converting Averdupois Pounds into their equivalent Troy Pounds.

lbs. Averd.		*lbs. Troy.*	*lbs. Averd.*		*lbs. Troy.*
1	=	1·215277	6	=	7·291666
2	=	2·430555	7	=	8·506944
3	=	3·645833	8	=	9·722222
4	=	4·861111	9	=	10·937500
5	=	6·076388			

TABLE VI.

For converting Troy Pounds into their equivalent Averdupois Pounds.

lbs. Troy.		*lbs. Averdup.*	*lbs. Troy.*		*lbs. Averdup.*
1	=	0·82285714	6	=	4·93714285
2	=	1·64571428	7	=	5·76000000
3	=	2·46857142	8	=	6·58285714
4	=	3·29142857	9	=	7·40571428
5	=	4·11428571			

TABLE VII.

For converting Ounces, Drachms, and Grains Troy into Decimals of the Troy Pound.

Grains.		*lbs. Troy.*
1	=	·00017361$\dot{1}$
2	=	·00034722$\dot{2}$
3	=	·00052083$\dot{3}$
4	=	·00069444$\dot{4}$
5	=	·00086805$\dot{5}$
6	=	·00104166$\dot{6}$
7	=	·00121527$\dot{7}$
8	=	·00138888$\dot{8}$
9	=	·00156250$\dot{0}$

Drachms.		*lbs. Troy.*
1	=	·010416$\dot{6}$
2	=	·020833$\dot{3}$
3	=	·031250$\dot{0}$
4	=	·041666$\dot{6}$
5	=	·052083$\dot{3}$
6	=	·062500$\dot{0}$
7	=	·072916$\dot{6}$

Oz.		*lbs. Troy.*
1	=	·083$\dot{3}$
2	=	·166$\dot{6}$
3	=	·250$\dot{0}$
4	=	·333$\dot{3}$
5	=	·416$\dot{6}$
6	=	·500$\dot{0}$
7	=	·583$\dot{3}$
8	=	·666$\dot{6}$
9	=	·750$\dot{0}$
10	=	·833$\dot{3}$
11	=	·916$\dot{6}$

TABLE VIII.

For converting Decimals of the Troy Pound into Troy Ounces, Drachms, and Grains.

lbs.		*oz.*		*dr.*		*grs.*
·1	=	1	:	1	:	36
·2	=	2	:	3	:	12
·3	=	3	:	4	:	48
·4	=	4	:	6	:	24
·5	=	6	:	0	:	0
·6	=	7	:	1	:	36
·7	=	8	:	3	:	12
·8	=	9	:	4	:	48
·9	=	10	:	6	:	24

lb.		*oz.*		*dr.*		*grs.*
·01	=	0	:	0	:	57·6
·02	=	0	:	1	:	55·2
·03	=	0	:	2	:	52·8
·04	=	0	:	3	:	50·4
·05	=	0	:	4	:	48·0
·06	=	0	:	5	:	45·6
·07	=	0	:	6	:	43·2
·08	=	0	:	7	:	40·8
·09	=	0	:	8	:	38·4

lbs.		*grs.*
·001	=	5·76
·002	=	11·32
·003	=	17·28
·004	=	23·04
·005	=	28·80
·006	=	34·56
·007	=	40·32
·008	=	46·08
·009	=	51·08

N° VI.

TABLE *shewing the correspondence between the new French and the English weights and measures.*

I. MEASURES OF LENGTH.

The metre being at 32°, and the foot at 62°.

		English Inches.		*Miles*	*fur.*	*English Yds.*	*ft.*	*in.*
Millimetre	=	·03937						
Centimetre	=	·39371						
Decimetre	=	3·93710						
Metre	=	39·37100						
Decametre	=	393·71000	=	0	0	10	2	9·7
Hecatometre	=	3937·10000	=	0	0	109	1	1
Kilometre	=	39371·00000	=	0	4	213	1	10·2
Myriametre	=	393710·00000	=	6	1	156	0	6

II. MEASURES OF CAPACITY.

		Cubic Inches.		*Tons.*	*hogs.*	*English wine gal.*	*pints.*
Millilitre	=	·06103					
Centilitre	=	·61028					
Decilitre	=	6·10280					
Litre	=	61·02800	=	0	0	0	2·1138
Decalitre	=	610·28000	=	0	0	2	5·1352
Hecatolitre	=	6102·80000	=	0	0	26·419	
Kilolitre	=	61028·00000	=	1	0	12·19	
Myriolitre	=	610280·00000	=	10	1	58·9	

III. MEASURES OF WEIGHT.

		English Grains.		Avoirdupois. *lbs.*	*oz.*	*dr.*
Milligramme	=	·0154				
Centigramme	=	·1544				
Decigramme	=	1·5444				
Gramme	=	15·4440				
Decagramme	=	154·4402		0	0	5·65
Hecatogramme	=	1544·4023	=	0	3	8·5
Kilogramme	=	15444·0234	=	2	3	5
Myriogramme	=	154440·2344	=	22	1	2

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PART I.

ELEMENTS OF PHARMACY.

PHARMACY is that branch of the science of chemistry which relates to the combination and mixture of different substances for the purposes of medicine.

Its practice presupposes a knowledge of the ultimate principles of the substances employed in its operations, and of their chemical agencies; and hence, of the general doctrines of Chemical Science. The elements, therefore, of Pharmacy, properly speaking, are those of Chemistry; and without a knowledge of these, it cannot be either theoretically understood, or advantageously practised as an art.

As, however, it would be impossible in this place to give more than an outline or epitome of the elements of Chemistry, and as the second part of this work is intended to contain the analysis as well as the history and uses of the different articles of the Materia Medica which constitute the subjects of Pharmacy, I shall confine the term Elements of Pharmacy to comprehend those general principles of chemical action which enable us to reason on, and perceive the proximate causes of the results of pharmaceutical combinations; and to the explanation of the operations of Pharmacy, with a description of the apparatus.

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OF PHARMACEUTICAL OPERATIONS, AND THE DESCRIPTION OF THE APPARATUS.

SECTION I.

THE agents which more generally influence chemical, and thence pharmaceutical combinations, are *Attraction* and *Repulsion.*

I. ATTRACTION.

ATTRACTION is the term employed to denote that force which causes bodies to approach towards each other, and which preserves them in a state of union after they come into contact. We are ignorant of the cause of this force, but some of the laws respecting it are sufficiently evident; and from observing the different phænomena to which these give rise, we are inclined to believe that there are different species of attractions, although, perhaps, the difference is more in degree than in kind.

When this force is exerted on masses of matter, at sensible distances, and in the direct ratio of the quantity of matter, and the inverse one of the square of the distance, it is named *gravitation:* but when its operation is confined to the minute atoms of bodies, and is exerted only when these are near to each other, or in apparent contact, it is denominated *contiguous attraction.* The former preserves the planets in their orbits, and sustains in their places all the parts of the magnificent frame of the universe: the second is the cause of the regular figures of natural bodies, and of the various combinations of matter, which take place in and on the surface of our globe. It is this variety that we are here to examine.

CONTIGUOUS ATTRACTION, operating on particles of the same kind, forms an aggregate or mass; and hence, the power in this instance is named the *attraction of aggregation* or *cohesion:* but acting on dissimilar particles, and producing bodies possessed of new properties, different from those of their components, it constitutes *chemical attraction*, or *affinity.*

a. OF COHESION.

The attraction of *cohesion* is that power which retains together the particles of bodies at insensible distances. According to the degree of force which it exerts, substances assume the solid, the fluid, or the aëriform state. 1. In solid bodies this force is sufficiently powerful to prevent their component particles from being moved with regard to each other, except in a very small degree; and to oppose a considerable resistance to any mechanical power applied to separate them. In the same kinds of bodies, all the circumstances being equal, it is always the same; but in dissimilar bodies it is exceedingly various: from which, and the peculiar arrangement of the particles, arise the different qualities of solids, denominated hardness, softness, malleability, ductility, and elasticity.

The attraction of cohesion in solids is exerted at insensible distances only, and may be weakened or altogether overcome by caloric, or that matter which produces the sensation of heat. If a piece of ice, for example, be brought near a fire, the cohesion of its particles is weakened as the caloric flows into it, till it is changed from the solid state to the fluid, or water; and by continuing and increasing the heat, the particles are still further separated from each other, until the fluid passes into the gaseous form, or becomes steam. This power is also weakened by chemical affinity; as when a solid body is put into a fluid, the affinity between the particles of the fluid and those of the solid is often sufficient to overcome the aggregation of the solid; and its detached particles being uniformly diffused through the fluid, now form a part of it, without altering either its fluidity or transparency. This constitutes the ordinary chemical or pharmaceutical process of *solution*, which is always favoured by the application of heat, owing to the assistance it affords in overcoming the cohesive attraction, as has been already noticed.

2. In *liquid* bodies this force also operates, but in a less degree than in solids, their particles being at a greater relative distance, and moveable with regard to each other by a very small force; but as their mobility does not change their relative distances, they remain within the sphere of this attraction, and are kept together. The exertion of this power varies in different liquids: it is greater in mercury than in water, and in this than in alcohol. It offers, however, scarcely any resistance to the combination of fluids with other bodies: and hence, the mutual affinity of two bodies is always favoured, when one of them is in the liquid state.

3. This attraction is not exerted over *aëriform* substances; for while these remain at the temperature necessary for the preservation of their aërial state, their particles mutually repel each other, and would recede to an indefinite distance, were they not prevented by the pressure of the surrounding bodies.

One of the most important results of this variety of contiguous attraction, in a pharmaceutical point of view, is the formation of crystals, or the regular and determinate figures assumed by many solids, when nothing opposes the union of their particles according to the laws of aggregation.

The process of crystallization, however, does not take place, unless the particles of the solid become moveable; and hence, in order to obtain any body in a crystalline state, it must first be rendered fluid, either by solution in a liquid, or fusion by heat.

The crystallization of salts is usually effected in the first method. When a salt is much more soluble in hot water than in cold, as is the case, for example, with sulphate of soda, nothing more is required for its crystallization, than to saturate boiling water with it, and set the solution aside to cool. As the caloric is dissipated, the saline particles gradually approach each other, and uniting, form solids of that regular shape which characterizes the crystals of this peculiar salt. But when the salt is almost equally soluble in hot and in cold water, as muriate of soda for instance, its crystallization can only be effected by withdrawing by evaporation a part of the fluid; and the more slowly this takes place, the mutual attraction of the particles is more regularly effected, and the more regular is the shape of the crystals which are obtained. In both cases, however, the affinity of the saline particles at length ceases to act, while the fluid still retains as much saline matter as it can hold dissolved at the temperature of the atmosphere, or is a saturated solution; but, by a further evaporation, it will again yield crystals.

By *fusion*, bodies which are not soluble in water, as glass, sulphur, &c. are enabled to assume the crystalline form. In this case the body is, as it were, dissolved in caloric; and the particles being separated from each other, these, when the cooling is gradual, assume, in aggregating, the regular arrangements which take place in crystallization. This mode of crystallizing substances is never used for pharmaceutical purposes.

Crystallization is promoted or retarded by various circumstances, to be afterwards noticed. (See *Section* iii.) Its theory is still obscure; but some light has been thrown upon it by the experiments of Haüy. He found that crystals may be mechanically divided, and reduced to certain primitive forms, which are always the same in the same kind of substances, and depend upon the figure and the mode of combination of the integrant particles composing the crystals. The varieties of figure of these particles, notwithstanding the great diversity of crystalline forms, are reducible to three: namely, 1. the parallelopiped, the faces of which are six, and parallel two and two; 2. the triangular prism; and 3. the tetrahedron, or four-sided pyramid: and these particles, therefore, according to the mode in which they unite, which may be either by their faces or their edges, form primitive crystals, which are the nuclei of the secondary crystals. The forms of primitive crystals may be reduced to the following six: 1. the parallelopiped, including the cube, the rhomboid, and all solids terminated by six faces, parallel two and two; 2. the regular tetrahedron; 3. the octahedron with triangular faces; 4. the six-sided prism; 5. the dodecahedron, terminated by rhombs; and 6. the dodecahedron, with isosceles triangular faces. The variations of the forms of secondary crystals are considerable in the same salt, and depend, in general, either on variations in the proportions of the ingredients which compose the integrant particles, or on the properties of the solvent in which the crystals are formed: thus alum crystallizes in octahedrons, but the addition of a little alumina produces cubes; and an excess of this earth prevents crystallization altogether: thus also, muriate of soda, which crystallizes in cubes, when dissolved in water, assumes the regular octahedral form when it is crystallized in urine. Independent, however, of these causes, a variety of secondary forms make their appearance; which the theory of Haüy explains by supposing that, as the matter which envelopes the primitive nucleus to form a secondary crystal is attracted in thin layers, each layer decreasing in size in consequence of one or more rows of integrant particles being abstracted from its primitive edges or angles. The decrements may be on the *edges* of the slices, which correspond with the edges of the primitive nucleus; or on the *angles*, that is, parallel to the diagonals of the faces of the primitive nucleus; or the decrements may be *intermediate*, parallel to lines situated obliquely between the diagonals and edges of the faces of the primitive nucleus. It would be impossible, however, to give a satisfactory view of this ingenious theory in the narrow compass of this epitome; and therefore I must refer the reader to Haüy's *Traité de Minéralogie*, tomes 1 and 2; to the *Annales de Chimie*, tom. 17; and the 3d volume of the fifth edition of Thomson's *System of Chemistry*.

Such is the attraction of aggregation, and its general effects. It is frequently concerned in modifying pharmaceutical results; but it is a power of much less importance than the next variety of *contiguous attraction*.

b. OF CHEMICAL ATTRACTION, OR AFFINITY.[1]

Chemical attraction or affinity is that power by which dissimilar substances placed under certain circumstances are enabled to unite, and form new aggregates, in which the properties of the component particles are lost or changed. Its action is confined to the minute atoms or particles of bodies, and is exerted only at insensible distances: not indifferently, however, between the particles of all bodies, but electively. The result of its operation is a *combination* of the constituent particles of the substances so intimate that the components cannot be recognised, nor separated by any mechanical force. Thus, lime acts as a powerful caustic when applied to animal matter, and is partially soluble in water; phosphoric acid has an acid taste, and is very soluble in water; but phosphate of lime, the compound produced by the chemical combination of these substances, is inert, insipid, and insoluble in water; and cannot be again resolved into lime and phosphoric acid by any mechanical power.

Chemical combination, therefore, is the result of the affinity of two or more substances for each other. It differs from *Mixture*, in which the substances are only blended without acquiring any new properties, and in which the dissimilar parts are easily discovered, and may be separated by mechanical powers. Chemical compounds can, however, be decomposed, either by exposure to a high temperature, which weakens the force of attraction existing between their principles; or by mixture, under favourable circumstances, with some other chemical agent, which has a more powerful affinity for one of its components than these have for each other: and by these means, which constitute *chemical analysis*, the principles of a compound may be ascertained.

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[1] The following observations on affinity may be regarded, in a great degree, as an abridgment of the excellent chapter on this subject in the first volume of *Dr. Murray's System of Chemistry*.

PART II.

MATERIA MEDICA.

MATERIA MEDICA is that department of the science of medicine, that treats of the nature and properties of the substances which are employed as remedies to restore health in diseased bodies.

According to this definition, it should comprehend every remedy, whether it be a simple, the production of nature, or a compound artificially prepared by the pharmacopolist: but the British Colleges of Physicians confine the application of the term, in their pharmacopœias, to those remedies only which are simples, and such compounds as are articles of general commerce, or over the preparation of which they have no control. These pharmacopœias differ also from the works of the generality of systematic writers on Materia Medica, in arranging the substances alphabetically, without any regard to their affinities as natural objects, or their medicinal virtues. This mode, although it be not so scientific, yet is much less liable to objection than many of the other modes that have been occasionally adopted; as the best of these have been, generally, too much modified by the prevailing theoretical doctrines of the day, which, unfortunately for medical science, have, hitherto, had too slight a foundation on truth to secure their permanence. The plan of the pharmacopœias has consequently been judiciously followed by the compilers of Dispensatories; and the convenience and utility of it is so generally acknowledged, that we the more readily comply with our own opinion of its propriety in adopting it.

This part of our work, therefore, contains the lists of the materia medica of the pharmacopœias issued by the London, the Edinburgh, and the Dublin colleges; and subjoined to the name of each of the substances supplied by the vegetable and the animal kingdoms, a description of the plant or the animal which yields the remedy, is given in the language and after the method of Natural History. The chemical characters, as far as they are known, of these matters are also stated; and the analysis of such remedies as are more immediately the objects of chemical investigation, with the medical properties and uses of all of them, are detailed; so as to afford every useful information regarding them, in a form the most convenient for practical reference.

ABIETIS RESINA. Vide *Pinus Abies.*

ABSINTHIUM. Vide *Artemisia Absinthium.*

ACACIA. *Spec. Plant. Willd.* iv. 1085.

Cl. 23. *Ord.* 1. Polygamia Monœcia. *Nat. ord.* Lomentaceæ *Linn.* Leguminosæ *Juss.*

G. 1902. *Hermaph. Calyx* five-toothed. *Corolla* five-cleft, or formed of five petals. *Stamens* 4-100. *Pistil.* 1. *Legume* bivalve. *Male. Cal.* five-toothed. *Cor.* five-cleft, or formed of five petals. *Stam.* 4-100.

**** *Leaves bipinnate, stipular thorns or prickles, elongated spikes.*

Species 73. Acacia *Catechu*[1]. Catechu. *Med. Bot.* 2*d edit. t.* 157.

***** *Leaves bipinnate, stipular thorns, globular spikes.*

Species 87. Acacia *vera.* Acacia, or Egyptian Thorn. *Med. Bot.* 2*d edit. t.* 158. *Vesl. Ægypt. t.* 8. *bona.*

1. ACACIA CATECHU.

Officinal. CATECHU EXTRACTUM. *Lond.* ACACIÆ CATECHU EXTRACTUM, Edin. CATECHU; EXTRACTUM E LIGNO. *Dub.* Extract of Catechu.

Syn. Cachou (*F.*) Katechu; Kaschu (*G.*) Cato o Catecu (*I.*) Cutt. (*Hind.*)

This tree grows plentifully in the mountains of Kanhana in Hindostan; and flowers in June. It seldom exceeds twelve feet in height, and one foot in the diameter of its stem, which is covered with a thick, rough, brown bark, and towards the summit is divided into many close branches. The leaves are placed alternately on the younger branches; and are composed of fifteen or thirty pairs of partial pinnæ nearly two inches long, each having about forty pairs of linear leaflets, beset with short hairs; with a small gland on the petiole between the bases of each pair of the pinnæ. At the base of each leaf are two short, recurved spines. The flowers are hermaphrodite and male; axillary, and on close spikes four or five inches long: the calyx is tubular, hairy, dividing into five oval pointed segments; the corolla of one piece, whitish, twice the length of the calyx, and of the same form. The filaments are numerous, double the length of the corolla, crowned with roundish anthers, and adhering at the base of the germen, which is oval, supporting a slender style the length of the filaments, and terminated by a simple stigma. The fruit is a lanceolate, compressed, smooth, brown pod, with an undulated thin margin; and contains six or eight roundish flattened seeds, which emit a disagreeable odour when chewed.

The inner wood of this tree is of a brown colour; and from it, according to Mr. Kerr's statement[2], the *catechu* is prepared. "After felling the trees, the manufacturer carefully cuts off all the exterior white part of the wood. The interior coloured part is cut into chips, with which he fills a narrow-mouthed unglazed earthen pot, pouring water upon them until he sees it among the upper chips: when this is half evaporated by boiling, the decoction, without straining, is poured into a flat earthen pot, and boiled to one-third part; this is set in a place to cool for one day, and afterwards evaporated by the heat of the sun, stirring it several times in the day: when it is reduced to a considerable thickness, it is spread upon a mat or cloth, which has previously been covered with the ashes of cow-dung; this mass is divided into square or quadrangular pieces by a string, and completely dried by turning them in the sun, until they are fit for sale." Before this account was published, catechu was generally supposed to be extracted from the Areca nut; there are, however, two other species, which are extracted from that nut; the one named *Cuttacamboo*, the other *Cashcutti*, and both used by the Indian practitioners.

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[1] The name in Bahar is *Coira,* or *Keira.*

[2] *Med. Obs. and Enquir.* vol. v. p. 151.

This extract when first introduced as a medicine into Europe was named Terra Japonica, from the supposition that it came from Japan, and was an earth. It is named *cutt* by the natives of Hindostan, cutch by the English, and by different authors khaath, cate, cachou, cachore[1], and *catechu.*[2] There are two varieties of the true catechu; one brought from Bengal, the other from Bombay. It is imported into Britain in bags, and sometimes in boxes or chests, containing from 3 to 4 cwt. each: and occasionally in small squares, in boxes, which is at all times preferred. The pale and the dark-coloured are mixed in the same package.

Qualities. — Pale catechu is generally in small square cakes of a pale reddish brown colour, light and friable, with a lamellated texture, and rough fracture; has a bitterish and astringent taste with a degree of sweetness; and is inodorous. The dark which is in round masses, has a deep chocolate colour internally, with the hue of rusty iron on the outside; the texture is uniform, and the fracture resinous and shining. It is heavier than the pale; and has a more austere and bitter taste; but in other respects agrees with it. Both are often much adulterated with sand, and other impurities. According to the analysis of Sir H. Davy there appears to be very little difference between the two varieties. Either is almost entirely soluble in the mouth: 100 grains in 18 fluid ounces of water at 52°, left seven grains and a quarter only undissolved, and these were chiefly lime, aluminous earth, and sand. The solutions are inodorous, and slightly redden tincture of litmus. Sulphate of iron and gelatine throw down precipitates in them, demonstrating the presence of *gallic acid* and *tannin*: what remains after the action of alcohol is nearly a pure *mucilage*; and when fine powder of catechu is washed with water until all the tannin and mucilage are dissolved, a pale red *extractive matter*, very slightly astringent, sweetish, and soluble in water and in alcohol, is obtained as a residue. The proportions of these constituents according to Davy were as follows: Two hundred grains of *Bombay catechu* afforded 109 of tannin, 68 of extractive matter, 13 of mucilage, and 10 of earths and other impurities. The same quantity of *Bengal catechu* gave 97 of tannin, 73 of extract, 16 of mucilage, and 14 of impurities.[1]

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[1] Bolduc, *Mem. Acad.* 1709, p. 293.

[2] This name is said to be compounded of two Oriental words, *cate*, which signifies a tree, and *chu*, juice. *Kerr*, l. c.

Medicinal properties and uses.—Catechu is one of the most valuable of the vegetable astringents; and as the dark-coloured contains the greater quantity of tannin, on which its astringency depends, it is to be preferred for medicinal use. It is employed with the best effects in dysentery, and diarrhœa, when the use of astringents is admissible; in alvine and uterine hæmorrhages, leucorrhœa, gleet, and in obstinate catarrhal affections. As a local astringent it is used in sponginess of the gums, and aphthous ulcerations of the mouth and fauces: and we have found the slow solution of a small piece of it in the mouth, a certain remedy for the troublesome cough induced by a relaxed uvula, hanging into and irritating the glottis.

An ointment composed of ℥jv of catechu, ʒix of alum, ℥iv of white resin, and f℥x of olive oil, with a sufficient quantity of water, is in great repute in India as an application to ulcers.

The dose of catechu may be from grs. xiij to ʒj.

Officinal Preparations. *Infusum catechu.* L. E. *Tinctura catechu.* L. E. *Electuarium catechu compositum.* E. D.

2. ACACIA VERA.[2]

Officinal ACACIÆ GUMMI. *Lond.* ACACIÆ ARABICÆ GUMMI. *Edin.* GUMMI ARABICUM. *Dub.* Acacia Gum, *or* Gum arabic.

Syn. Gomme Arabique (*F.*) Arabischen gummi (*G.*) Gomma Arabica (*I.*) Goma Arabiga (*S.*) Vullām pisin (*Tam.*)

This species of acacia is found in almost every part of Africa; but the trees that yield the gum which is exported from Barbary to Great Britain, grow principally in the Atlas mountains, and at Bled-eljerrede; flowering in July. It has a hard withered aspect, and does not rise many feet in height. The stem is crooked, and covered with a gray bark, which on the branches has a purplish tinge: the leaves are alternate, bipinnatifid, composed of several pairs of opposite partial pinnæ furnished with a small gland between the base of each pair, and having numerous pairs of narrow elliptical, smooth leaflets. On each side of the base of the leaves are two long diverging, white spines. The flowers are hermaphrodite and male, crowded in-

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[1] *Philosophical Transactions*, 1803.

[2] Ακακια Dioscoridis. In Barbary it is named *attaleh*,— Jackson's Account of Morocco, 4to, p. 33 or *al thlah* or *tolh*,—*Nicholson's Journal*, iv. 370.

to globular heads, (*capitula*) rather than spikes, which are supported on slender peduncles, and rise, four or five together, from the axillæ of the leaves: the calyx is small, bell-shaped, and five-toothed; the corolla is divided into five narrow yellowish segments; the filaments are numerous, capillary, bearing roundish yellow anthers; the germen is conical, with a slender style and simple stigma; and the pods, which are three or four inches long and half an inch broad, contain several flattish brown seeds.[1]

The gum exudes naturally from the bark of the trunk and the branches of the tree, in a soft, nearly fluid state, and hardens in the air without losing its transparency. It is collected about the middle of December. "It appears," Mr. Jackson informs us, "to be the product of disease; for in the hottest seasons, and from the most sickly trees, the greatest quantity is procured. Very little or none is got in a moist, cool, or mild summer. It is gathered in July and August when the weather is hot and parching; has a faint smell when first stowed in the warehouses, and is heard to crack spontaneously for many weeks. The best gum is procured from Morocco, Rasel-wed in the province of Suse, and Bledhummer in the province of Abda."[2] It is imported from Barbary and Morocco in large casks. Gum Senegal, which was introduced into Europe by the Dutch in the 17th century, is obtained from various trees, but chiefly from two, one called *vereck*, which yields a white gum, the other called *nebuel*, which yields a red gum.

Qualities. — Gum is generally in irregularly shaped pieces, hard, brittle, semitransparent, its fracture possessing a considerable degree of lustre; and is neither fusible nor volatile. When pure, it is almost colourless, or of a pale yellowish hue; is insipid, inodorous, and dissolves completely away in the mouth. Its specific gravity varies from 1,3161 to 1,4317. It is often mixed with the gum Senegal, which is as pure, and with other gums less pure, particularly a kind brought from the East Indies, which is darker-coloured and less soluble.[3]

Gum is soluble in water, either cold or hot, and forms a viscid solution; which, if evaporated, becomes very thick and adhesive, and at length the gum is obtained in a concrete form, equally soluble as before. It is also soluble in the vegetable acids; but is insoluble in alcohol, ether, and in oils: yet, owing to its viscidity, it renders by trituration both the volatile and fixed oils and resins miscible with water, forming a white opaque mixture. Concentrated sulphuric acid blackens, and partially decomposes it, and acetic acid is produced : strong nitric acid converts it into the oxalic, malic, and saccholactic acids; muriatic exerts very little action on it; but the oxymuriatic changes it into citric acid. Solutions of the alkalis and alkaline earths dissolve it without producing on it much change. For an account of the action of other agents on it, see *Mucilago acaciæ.*

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[1] From the unripe pods the *acaciæ veræ succus* of the ancients was expressed. Vide *Murray, App. Med.* ii. 412. The seeds yield a reddish dye. *Jackson*, l. c. [2] *Jackson*, p. 83. In 1805, the quantity exported from Mogodor to London was 277534lbs. Ib. l. c.

[3] Gum exudes from the cherry, plum, and other trees of the genus *Prunus*, in this country: but the gum alluded to, which is very similar to gum arabic, is furnished by the Acacia *Arabica*, or Babul tree of Hindostan. The gum is called *Babúled gúnd*, by the natives.

The chemical analysis of gum, by Gay Lussac and Thenard shows, that its constituents are 42,23 of carbon, 6,93 of hydrogen, and 50,82 of oxygen, with a small proportion of nitrogen and lime; which last element is supposed to render it incapable of undergoing the fermentative process. [1]

Medical properties. — Gum exerts no action on the living system [2]; but is a simple demulcent, serving to lubricate abraded surfaces, and involve acrid matters in the primæ viæ. In the solid form it is scarcely ever given, unless to sheath the fauces, and allay the tickling irritation which occasions the cough in catarrh and phthisis pulmonalis; in which cases a piece of it is allowed to dissolve slowly in the mouth. It is chiefly used in the state of mucilage. Vide *Mucilago acaciæ.*

Officinal preparations. *Mucilago acaciæ.* L. E. D. *Emulsio acaciæ Arabicæ.* E. *Emulsio arabica.* D. *Troc. gummosi.* E.

ACETOSÆ FOLIA. Vide *Rumex Acetosa.*

ACETOSELLA. Vide *Oxalis Acetosella.*

ACETUM. *Lond. Edin.* ACETUM VINI. *Dub.* Vinegar.
Syn. Vinaigre (*F.*) Essig (*G.*) Aceto (*I.*) Vinagre (*S.*) Khull (*Arab.*) Chaoca (*Malay.*)

This is a well known acid liquor, produced by exciting the acetous fermentation in substances which have undergone, or are susceptible of, the vinous fermentation. Sugar and water, the saccharine vegetable juices, infusions of malt, malt liquors, cyder, and wine[3], may be converted into vinegar, by adding to them yeast or any other ferment, and exposing them in vessels to which the air has access, in a temperature between 75° and 90°. In wine countries, as France and Italy, vinegar is made from the lees of wine, which are worked up with new wine, then strained, and exposed to the heat of the sun, or placed in stoved rooms, in casks set upright, with a hole cut through the heading, and left open until the whole of the liquor is thoroughly acidified. In this country it is prepared chiefly from malt. An infusion of malt is made, then properly cooled, and put into large and deep fermenting tuns; "where it is mixed with yeast, and kept in fermentation for four or five days." The liquor is now distributed into smaller vessels, placed in a chamber heated by means of a stove; and kept there for about six weeks, or until the whole is soured. This is emptied into common barrels which are placed in the open air, the bung-hole of each being simply covered with a tile to keep out the wet; and in this situation such a gentle fermentation goes on, that in four or five months, according to the heat of the weather, perfect vinegar is formed. The process is then completed in the following manner: "Large tuns are employed, with a false bottom, on which is put a quantity of the refuse of raisins and other fruit, left by makers of home-made wines, called technically *rape*. These rape tuns are worked by pairs; one of them is quite filled with the vinegar from the barrels, and the other only three quarters full, so that the fermentation is excited more easily in the latter than the former, and every day a portion of the vinegar is laded from one to the other till the process is finished.[1]"

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[1] *Murray's Chemistry*, vol. iv. 180. The last analysis, which is by Berzelius, makes the components in 100 parts to be, hydrogen 6,792, carbon 41,752, and oxygen 51,456.

[2] It is sometimes used as food by the Moors.

[3] New wines are better for this purpose than old, as they contain more extractive matter.

The theory of the acetous fermentation is not yet fully understood. Air and a moderate temperature are necessary for exciting and keeping it up. The former affinities between the components of the ingredients are broken, and new ones formed; while a quantity of carbon is thrown off, and uniting with the oxygen of the air, produces the carbonic acid gas, which appears during the process. Although alcohol alone cannot be converted into vinegar, yet the strongest wine produces the best vinegar; and hence that made from malt is weaker, less pure, and more liable to spoil, than wine vinegar. The essential part of vinegar is *acetic acid* largely diluted with *water*; but it also contains some undecomposed *alcohol*, *gluten*, *mucilage*, *sugar*, *extractive matter*, and often some *malic* and *tartaric acids*.

Qualities. — Vinegar, when well made, is clear and limpid; has an agreeable penetrating odour, and a pleasant acid taste.

The colour varies from a pale yellow to a deep red; and as it is derived from the extractive matter, malt vinegar is always higher coloured than wine vinegar. When long kept, particularly if it be exposed to the air, vinegar becomes muddy and ropy, acquires an unpleasant smell, loses its acidity, and putrefies. It, however, may be kept good for a much longer time, if it be boiled for a few minutes, so as to coagulate and separate the gluten, on the presence of which the above changes depend; and be preserved in well corked bottles. It is sometimes adulterated with sulphuric acid, which is detected by a solution of nitrate of barytes, forming, when dropped into the suspected vinegar, a white precipitate, which is insoluble in nitric acid, after being exposed to a strong heat.

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[1] *Aikin's Dictionary of Chemistry*, art. *Vinegar*.

The use of vinegar as a condiment, and an antiseptic, for pickling and preserving animal and vegetable matter, is well known.

Medical properties and uses. — Vinegar, when taken into the stomach, acts as a refrigerant, promotes diaphoresis and the discharge of urine; and is a powerful anti-narcotic: its external action on the living fibre is moderately stimulant and astringent.

In inflammatory fevers it may be used to acidulate the ordinary beverage. It is given as a remedy in putrid diseases and scurvy; and is the most easily procured, and the best means of counteracting the fatal effects of over doses of narcotic poisons; for which purpose it should be administered in doses of a table spoonful, frequently repeated, after the stomach has been freely emptied by a proper emetic. It is employed as a glyster in obstinate costiveness; and externally in the form of fomentation, or of lotion, in burns, bruises, sprains, and chronic ophthalmia; and diluted with water, it is the best lotion for clearing the eye of small particles of lime, when they adhere to any part of the ball or the lids. Its vapour is inhaled in putrid sore throat; and is, diffused through sick rooms with the view of neutralizing pestilential effluvia: but as a fumigation it has little efficacy. The dose of vinegar is fʒj to fʒij; and the quantity given in glysters f℥j to f℥ij.

Officinal preparations. *Acidum aceticum.* L. E. D. *Acidum aceticum forte* E. D. *Syrupus aceti.* E.

A'CIDUM CITRICUM CRYSTALLIS CONCRETUM. *Dub.* Vide *Acidum citricum* among the Preparations.

A'CIDUM SULPHURICUM. *Lond. Edin. Dub.* Sulphuric Acid. (*Specific gravity* 1,850. *Lond.* 1,845. *Edin. Dub.*)

Syn. acide sulphurique (*F.*) Schweffelsaure (*G.*) Acido solfarico (*I*) Gundai-ca Atr. (*H.*)

This acid is said to be found in a concrete state, in the cavities of some volcanic mountains, and dissolved in some mineral waters; but for the purposes of medicine, and the arts, it is prepared artificially, either by decomposing sulphate of iron[1] by the process of distillation in close vessels; or by the combustion of sulphur. The first mode is the most ancient, and is still employed in several places on the continent; but the second is that generally adopted by the manufacturers in Great Britain, and therefore, requires particularly to be described.

[2] Into a chamber lined with sheet lead, having no opening but a small door placed a few inches from the floor, and made to shut very close, water is poured so as to cover the floor, and rise upon it to the height of one or two inches. A stand is then introduced, on which is placed an earthen pot containing a mixture of nine parts of refined Sicilian sulphur, and one of nitre, which is kindled by means of a red-hot iron, and the door instantly closed. The oxygen of the air of the chamber, and

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[1] Hence the old name of oil of *vitriol,* which is still the commercial name of this acid, from *green vitriol,* the old name of the sulphate of iron.

[2] This process was first used by Dr. Roebuck in 1749. *Edin. Phil. Trans.* vol. iv.

of the nitre, keeps up the combustion of the sulphur and forms sulphurous acid gas, and nitrous acid, which uniting, lose their gaseous character, and coming in contact with the water below, the sulphurous acid is changed into sulphuric at the expence of the nitrous acid, which being thus robbed of its oxygen, escapes in the form of nitrous gas. But repeated charges of the sulphur and nitre are required to be constantly introduced at intervals of six or eight hours, for the space of two or three weeks, before the water is sufficiently acidified. It is then drawn off through a leaden pipe with a stop-cock at the bottom of the chamber; and contains, besides sulphuric acid, some sulphurous acid, and a portion of nitric oxide. The liquor is at first of a brownish colour; but after it is concentrated and purified, first by evaporation in leaden boilers, and afterwards by boiling in large green glass retorts, it becomes a colourless, dense fluid, having when perfectly pure a specific gravity not exceeding 1·8455; and is thus brought to market in large globular glass bottles, surrounded with wicker work, & sold under the name of *oil of vitriol.*

Sulphuric acid thus prepared is not perfectly pure, but is united with about ¾ of a part in the hundred[1] of sulphate of potass, (owing to the acid uniting with the potass of the nitrate employed in the combustion of the sulphur,) and a minute portion of sulphate of lead. Both these impurities are precipitated by adding three parts of distilled water to the acid, which can again be concentrated by distillation: hence the addition of water is a good test of the purity of this acid. The amount of these impurities may be readily ascertained by evaporating a definite weight of the acid in a platina cup, placed on the red cinders of a common fire.[2] According to Dr. Ure, the pure acid consists of about 81·54 parts of real acid, and 18·16 of water; and the elements of the real acid, according to the estimate of Dr. Thomson,[3] which is probably the most accurate on this subject, are 40 of sulphur, and 60 of oxygen, in 100 parts of acid: but with regard to these proportions chemists are not agreed.

Qualities.—Liquid sulphuric acid, when pure, is as colourless and transparent as water, inodorous, heavy; and has the consistence of oil. It has all the generic characters of an acid; reddens the vegetable colours and, even when largely diluted, has an intensely acid taste. When rubbed between the fingers it feels at first unctuous, owing to its dissolving the cuticle, and afterwards excites a burning sensation. It freezes at 15° into six-sided prismatic crystals, bevilled at both extremities; and when of the spec. gravity 1·845, boils at 560°.[1] It attracts water rapidly from the atmosphere, so as to double its weight in the course of a month, (hence the necessity of keeping it in well stopped bottles;) and at the moment it unites with water the temperature of the mixture is much raised. It acquires a brown colour when mixed with any vegetable matter,[2] and therefore bottles in which it is kept must be stopped with glass stoppers. It forms neutral salts with the alkalies, earths, and metallic oxides, and decomposes the alkaline and earthy sulphurets.

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[1] The common acid of the shops contains 3 or 4 per cent. of saline matter.

[2] Dr. Ure, who suggested this test, says, "if more than 5 grains of matter remain from 500 of acid, we may pronounce it sophisticated." *Journ. of Science and the Arts,* vol. iv. p. 115.

[3] *System of Chem.* 5th ed. vol. i. p. 283.

[4] *Macnab, Hudson's Bay.*

Medical properties and uses. — This acid is a valuable tonic, astringent, and antiseptic; but as it is employed internally in a diluted state only, its medicinal powers shall be explained under the article *Acidum sulphuricum dilutum.* Although it powerfully corrodes the skin, yet, on account of its fluidity, it cannot be applied as an escharotic: but when united with sixteen times its weight of lard, it forms an ointment which has been successfully used in the cure of scabies.

Officinal preparations. *Acidum sulphuricum dilutum.* L. E. D. *Acid. sulphuricum aromaticum.* E. *Sulphas potassæ.* E. *Ferri sulphas.* L. E. D. *Hydrargyri Oxymurias,* L. E. D. *Sub-sulphas hydrargyri flavus.* E. *Zinci sulphas,* L. E. D.

ACIPENSER. *Syst. Nat. Gmelin.* 1483.

Cl. 4. *Ord.* 6. Pisces, Chondropterygii.

G. 134. *Head* obtuse; *mouth* far beneath the head, without teeth; *cirri* four under the nose, before the mouth. *Branchial apertures* lateral. *Body* elongated, with many series of angular tubercles.

Spec. 2. Acipenser *Ruthenus.* The Sterlet, or small sturgeon.

Spec. 3. Acipenser *Huso.* The Beluga, or great sturgeon.

Officinal. ICHTHYOCOLLA. *Dub.* Isinglass.

Syn. Ichthyocolle (*F.*) Hocusenblase (*G.*) Colla di Pisce o Ittiocolla (*I.*)

The beluga, the sterlet, and other species of sturgeon, are caught in the Volga, Danube, Ural, Oby, and Irtysh rivers; and the Caspian sea. The sturgeon is oviparous. The body is pentagonal, in length from 5 to 24 feet, of a dirty olive colour on the upper part, which is studded with five rows of bony tubercles, one row on the back and two rows on each side; while the underside of the fish is flat, and of a silvery white colour. There is a single dorsal fin near the tail, one ventral also near the tail, one anal, and two pectoral fins. The tail is bifurcated; and the upper part longer than the under.

Isinglass is prepared in Russia from the air-bladders or sounds of all the species of the sturgeon; and in Lapland it is made from several species of the perch.[3] That however, which is made from the beluga is reckoned the best. The process which is carried on during summer only, as frost it is said impairs its qualities, varies in different places: and on this account the quality of the isinglass made from the same fish at one place differs from that which is made at another. On the Volga, the sound is taken from the fish, slit open, well washed, and freed from the thin membrane which envelopes it; then exposed to stiffen a little in the air, rolled, and pinned, by means of a wooden peg, into a heart shape; in other places it is folded into leaves, or simply dried without any care, or boiled.[1] The first kind is the best. Isinglass is imported from Petersburgh in bales. Four sorts are brought; *long staple*, *short staple*, *book* and *leaf*. " The finest is that which has the longest *staple* as it is called; is the thinnest and most flexible;" and perfectly devoid of odour and taste. It should be composed of dry, whitish, nearly transparent, inodorous membranes.

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[1] *Dalton.*

[2] This is owing to its strong affinity for water, breaking the affinities which exist between the vegetable components, so as to occasion the hydrogen and oxygen to unite and form water, while the carbon is precipitated.

[3] Isinglass might be made from the sound of the cod-fish, Gadus *merrhua;* hake, Gadus *merlucius;* and ling, Gadus *molva,* which frequent the British seas.

Qualities.—Isinglass is insipid, and inodorous; when soaked in cold water it swells, softens, and becomes opalescent; and in one hundred grains of it, rather more than ninety-eight, according to Mr. Hatchett, are soluble in water. Three drachms of good isinglass, dissolved in one pint of warm water, produce on cooling a pretty firm, slightly opaline-coloured jelly, which is a compound of pure animal gelatin and water. Gelatin is soluble in the acids and pure alkalies; but is precipitated from its solution by infusions and decoctions of astringent vegetables, the tannin of which forms with it an insoluble compound[2]; carbonate of potass also throws down a precipitate; and alcohol separates it from water when added to its solution in any considerable quantity. The solution putrefies when kept for a few days. According to John, isinglass contains also traces of saline matter.[3]

Medical properties and uses.—The solution of ichthyocolla was formerly much given in cases of fluor albus and diarrhœa; but is now rarely used as a medicine. Its nutrient qualities are more obvious. By dissolving it in water, and adding a little sugar and lemon juice, an excellent nutritious jelly is produced, well adapted for the sick and convalescent. It is employed in the preparation of English court plaster.

ACONITUM. *Spec. Plant. Willd.* ii. 1235.

Cl. 13. *Ord.* 3. Polyandria Trigynia. *Nat. ord.* Multisiliquæ *Linn.* Ranunculaceæ *Juss.*

G. 1062. *Cal.* none. *Petals* five, the highest arched. *Nectaries* two, peduncled, recurved. *Pods*, three or five.

** *With blue corollas.*

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[1] *Philosophical Transactions*, vol. lxiii. pt. i.

[2] Gelatin is a nice test of the presence of tannin, for which purpose Sir H. Davy recommends 120 grains to be dissolved in 20 ounces of distilled water.

[3] Labor. chim. 1808.

Sp. 8. A. *Napellus.* Common Monkshood. (*Lond. Edin.*) *Med. Bot.* 2d *ed.* 461. *t.* 165.

—— 9. A. *neomontanum*, (Dub.) Jaquin. *Flor. Austr. t.* 381.

Officinal. ACONITI FOLIA. *Lond.* ACONITI NAPELLI FOLIA. *Edin.* ACONITUM; FOLIA. *Dub.* The leaves of Monkshood.

Syn. Aconit, chaperon de Moine (*F.*) Blauer-strumhut (*G.*) Napello (*I.*) Aconito (*S.*)

The species of aconite cited by the London and Edinburgh colleges has been, generally, regarded as the plant originally used by Stoerk: an error which originated with Stoerk himself, but, after a minute comparison of the plant with the description, we agree with Willdenow, and the Dublin college, that the *neomontanum* is the species which should be medicinally used. It is a perennial plant, flowering in July: and found native in the alpine forests of Carinthia, Carniola, and the mountainous parts of Germany.

The stem is firm, elongated, rising to the height of five or six feet, leafy, and terminating in a long sparse spike of flowers, racemose and branched below, with singeflowered peduncles. The lower leaves are few, alternate on long channelled petioles; palmated or rather pedate, being divided to the base into five broad cuneiform divisions, deeply cleft and toothed; the petioles are shorter, and the leaves less divided the nearer they are to the summit of the stem: the colour of the whole is a deep green on the upper disk, and a pale green on the under; both sides are naked, smooth, and shining. The flowers are of a deep violet colour, and stand alternately on the spikes, on unifloral, erect, axillary peduncles. They have no calyx; but two small, erect, calycinal stipules are placed one on each side of the peduncle within a few lines of the flower; the petals are five, the uppermost helmet-shaped and beaked, covering two singular, peduncled nectaries; the lateral ones broad, and roundish, the lower oblong, elliptical, and divaricating. These four are slightly pubescent. The filaments are spread and white at the base, where they closely cover the germens; but the upper part is filiform, purple, spreading, and bearing whitish anthers. The germens are three, four, or five, with simple reflected stigmas; and become capsules, containing many angular seeds.[1]

For medicinal use the leaves should be gathered when the flowers appear.

Qualities. — Aconite leaves when fresh have a faint narcotic odour: and a moderately bitter, acrid taste, leaving a painful sensation of heat in the mouth, when they are much chewed. The whole of the plant is poisonous; but the deleterious qualities are lost in a considerable degree when it is dried, or long kept, and much of its acrimony is dissipated. Both water and alcohol take up the active matter of aconite.

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[1] The flower-spikes of A. Napellus are shorter, denser, and the segments of the leaves narrower, and more linear, than those of A. Neomontanum.

Medical uses and properties. — Aconite is narcotic, diaphoretic, and in some cases diuretic. In over doses it occasions violent nausea, vomiting, hypercatharsis, vertigo, cold sweats, mania, and convulsions which terminate in death; and these effects appear to depend on its action on the nervous system, as dissections of fatal cases have not displayed any particular marks of organic disease.

Stoerk first administered aconite internally in chronic rheumatism, gout, exostosis, paralysis, and scirrhus; and since the publication of his experiments in 1762, it has been advantageously employed in similar cases, and also in amaurosis, scrophula, cancer, itch, venereal nodes, and intermittents. Much caution is required in the exhibition of it; and it is absolutely necessary to know the length of time it has been gathered, as its activity varies so very considerably, as to require this to be ascertained before the dose can be apportioned. It is given in the form of powder, extract, and tincture; and may be combined with calomel, antimonials, camphor, and guaiacum. The dose of the powder is one or two grains, gradually increasing it to six or eight.

Officinal preparations. *Extractum Aconiti.* L. E.

ACORUS. *Spec. Plant. Willd.* ii. 199.

Cl. 6. *Ord.* 1. Hexandria Monogynia. *Nat. ord.* Piperitæ *Linn.* Aroideæ *Juss.*

G, 663. *Spadix* cylindrical, covered with florets. *Cor.* petals six, naked. *Style* O. *Capsule* three-celled.

Sp. 1. A. *Calamus.* The Sweet-flag. *Med. Bot. 2d ed.* 725 *t.* 248. *Smith Flor. Brit.* 1, 373.

Offic. CALAMI RADIX, *Lond.* ACORI CALAMI RADIX. *Edin.* ACORUS; (CALAMUS AROMATICUS) RADIX. *Dub.* Sweet Flag.

Syn. Acorus odorant (*F.*) Kalmus nurtzil (*G.*) Calamo aromatico (*I.*) Acoro calamo (*S.*) Bach. (*H.*) Vacha (*San.*)

The sweet-flag is found growing in marshes and rivulets, over the greater part of Europe and Asia; and in Britain, in many parts producing its flowers in May and June.[1]

The root is perennial, horizontal, long, somewhat flatted, crooked; full of joints or rings, whence the radical fibres spring from the underside, branched; from half an inch to one inch in thickness; externally, when fresh, of a greenish yellow colour, internally whitish, and spongy. The leaves spring from the root; are sword-shaped, about three feet in length, and generally waved along one of the edges; of a bright green colour, and emitting a strong aromatic odour when bruised. The flowers are small, and produced on a very close tesselated conical spike four inches long, pushed out from the side, above the middle, of a naked stalk or scape, two-edged, and terminating like a leaf. They have no calyx. The petals are six: small, erect, regular, with the apex inflected, and of a pale, green colour. The filaments are alternate, with the petals, thread-like, supporting double anthers. The germen is elliptical, crowned with a sessile-pointed stigma.

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[1] In the rivers of Norfolk plentiful. On Hillingdon common, Middlesex, and other places about London. *Smith.* l. c.

The greater part of the roots in use are now brought from Norfolk; those from the Levant not being superior.

Qualities. — The root of sweet-flag has a pleasant aromatic odour, similar to that of a mixture of cinnamon and allspice; the taste is warm, bitterish, pungent, and aromatic.[1] In the dried state, the cuticle is corrugated, of a yellowish brown colour, with many small white elevated circles on the under side, whence the radical fibres issued. It breaks with a short rough fracture; is internally of a pale buff colour, and a spongy texture. Both the smell and taste are improved by exsiccation. The aromatic principle is an essential oil, which can be obtained by distillation, and with the bitter matter is extracted by infusion in boiling water. Like the root of Florentine iris it contains a considerable quantity of fecula, which is dissolved in the infusion, and copiously precipitated from it by acetate and superacetate of lead.

Medical properties and uses. — This root is tonic, and aromatic. It has been successfully used in intermittent fever, even, we are told, after bark had failed: and is a useful addition to other bitters, and stomachic infusions, in cases of dyspepsia; particularly when vertigo is one of the symptoms. It is too seldom prescribed. The dose in substance is from ℈j. to ʒi; and of the infusion, made with ʒvi. of the bruised root in f℥xij of boiling water, a cupful three or four times a day.

ADEPS. Vide *Sus Scrofa.*

ÆSCULUS. *Spec. Plant. Willd.* ii. 285.

Cl. 7. *Ord.* 1. Heptandria Monogynia. *Nat. ord.* Trihilatæ *Linn.* Acera *Juss.*

G. 717. *Cal.* one-leafed, five-toothed, swelled out. *Cor.* 4 or 5 irregularly coloured petals inserted into the calyx. *Cap.* three-celled.

Sp. 1. *Æ. Hippocastanum.* Common Horse Chesnut. *Med. Bot. 2d edit. t.* 217. *Gærtner de fructibus*, ii. 135.

Officinal. — CORTEX. *Dub.* The bark.

Syn. Marronier d'Inde (*F.*)

The horse chesnut is a native of the north of Asia, but cultivated in almost every part of Europe.[2] In this country it attains to great perfection, constituting one of the chief ornaments of our parks and avenues. It flowers in May.

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[1] Linnæus erroneously considered it the only native aromatic plant of northern climates. — The candied root is employed at Constantinople as a preservative against epidemic diseases.

[2] The horse chesnut was brought into Europe by Clusius in 1550; and first cultivated in England by John Tradescant in 1633.

This tree rises to a considerable height, branching, from the upper part of the trunk, so as to form a roundish conical mass. The leaves stand on long foot-stalks, are large, and digitated, each consisting of seven leaflets proceeding from a common centre; of a deep-green colour, and spatulate form; ribbed, pointed, and serrated. The middle leaflet of a full-grown leaf is about six inches long, and two broad near the top, the three lateral ones on each side gradually decrease in size, to the smallest, which are only three inches in length and one in breadth. The flowers are peduncled and disposed in handsome, terminal, erect, conical spikes. The calyx is one-leafed, of a pale green, bell-shaped, divided at the edge into five blunt teeth; the petals are five, ovate, slightly waved at the margin, ciliated, with claws inserted into the calyx, all inclining to one side so as to leave a gape betwixt the two innermost; white with an irregular spot of red, or yellow, directly above the claw. The filaments are awl-shaped, gracefully curved, supporting reddish, upright double anthers: the germen is cylindrical, with a pointed stigma. The fruit is a large, roundish, green-coloured, three-celled, three-valved capsule, having the bark armed with short spines; and generally containing two sub-globular seeds or nuts.

The fruit consists almost entirely of fecula. It is eaten with avidity by deer and some other animals; and were the acrimony destroyed by fire, it might be rendered fit food for men, in times of scarcity. For medical purposes the bark is taken from the middle-aged branches.

Qualities. — The *bark* is inodorous; and tastes bitter, astringent, and slightly aromatic: both water and alcohol extract its virtues. Its infusion has a brown colour; sulphate of iron and sulphate of zinc strike a black colour when added to it, and throw down a dark-coloured precipitate; oxymuriate of mercury and superacetate of lead precipitate it white. Gelatin also precipitates tannin from it; but much less than from oak bark: These substances, therefore, are incompatible in prescriptions with infusion or decoction of this bark.

Medical properties and uses. — The *bark* of the horse chesnut is tonic and astringent; and has been successfully used, particularly on the continent, in intermittents, typhus, and other cases in which cinchona is used; externally its decoction has been employed as a lotion in gangrene. We have had no opportunity of trying this bark; but we doubt much if it can supersede the cinchona in any case in which it is properly indicated.

The dose of the powder is ʒss; and of the strained decoction, (made with an ounce of the bark to a pint of water,) f℥jss or f℥ij, every three or four hours.

AGRIMONIA. *Spec. Plant. Willd.* ii. 875.

Cl. 11. *Ord.* 2. Dodecandria Dygynia. *Nat. ord.* Senticosæ *Linn.* Rosaceæ *Juss.*

G. 957. *Calyx* five-toothed, guarded by another. *Petals* five. *Seeds* two, in the bottom of the calyx.

Species 1. A. *Eupatoria.* Common Agrimony. *Med. Bot. 2d ed.* 500. *t.* 180. *Smith. Flor. Brit.* 511. *Flor. Dan. t.* 588.

Officinal. — AGRIMONIA; HERBA. *Dub.* Agrimony; the herb.

Syn. Aigremonie (*F.*) Agrimonia (*I.*)

This is an indigenous perennial plant, common about the borders of fields, and hedges, flowering in June and July.

The stem rises two feet in height, erect, leafy, angular, hairy, and of a reddish hue. The leaves are alternate, interruptedly pinnate, with three pair of opposite leaflets, and a terminal one somewhat lyre-shaped and hairy; the leaflets obovate, pointed, deeply serrated; the terminal one petiolate; the intermediate ones much smaller, entire or trifid. Stipules two, deeply cleft. The flowers, which are small, golden yellow, and peduncled, are in long, terminal, erect, hairy spikes; with trifid bractes. The calyx is persistent, inclosed within an involucre at the base of the germen, furrowed, and divided into five ovate, pointed segments, surrounded with rigid, hooked awns: the corolla consists of five ovate, spreading petals inserted into a glandular substance at the base of the germen. The filaments are from five to twelve; the anthers two-lobed. The germen is inferior, supporting two styles with blunt stigmas. The seeds two, one often abortive, contained in a capsule formed of the calyx.

For medical use this herb should be cut when fully in flower.

Qualities.—Agrimony when fresh has an agreeable aromatic odour, depending on a volatile essential oil, which is lost when the herb is dried.[1] The taste is bitterish and subastringent. The infusion of it in water reddens the more delicate vegetable blues, and strikes a black colour with sulphate of iron. Potass and its carbonate first change it to a yellow, then an orange colour, and lastly throw down a white precipitate.

Medical properties and uses. — Agrimony was formerly regarded as a remedy of much importance, as a tonic and deobstruent: but it is now very seldom or never prescribed. The dose in powder is from ℈i to ʒj, two or three times a day.

ÆRUGO. See *Cuprum.*

ALLIUM. *Spec. Plant. Willd,* ii. 63.

Cl. 6. *Ord.* 1. Hexandria Monogynia. *Nat. ord.* Spathaceæ *Linn.* Asphodeli *Juss.*

G. 626. *Corolla* six-parted, spreading. *Spathe* many-flowered.

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[1] The oil, which is yellow, can be obtained by distillation with water. — *Lewis.*

Umbel heaped together. *Capsule* superior.

** * Stem-leaves plane. Umbel bulbiferous.*

Species 14. Allium *sativum.* Garlic. *Med. Bot. 2d edit. t.* 256.

** * * * Leaves radical. Stem naked.*

Species 43. Allium *Cepa.* The Onion.

1 ALLIUM SATIVUM.[1]

Officinal. ALLII RADIX.[2] *Lond.* ALLII SATIVI RADIX. *Edin.* ALLIUM; RADIX. *Dub.* Garlic root.

Syn. Ail. (*F.*) Knoblauch (*G.*) Aglio (*I.*) Ajo sativo (*S.*) Lasúna (San.) Lehsen (*H.*)

Garlic is a perennial bulbous plant, found wild in Sicily, and cultivated in most parts of Europe, for culinary and medicinal use. It flowers in July.

The bulbs of this species of allium are numerous; three or more being inclosed in one covering forming a nucleus, round which others are disposed, and the whole enveloped in a common membrane, from the base of which proceed long white fibrous roots. The stem rises two feet in height, surrounded with many long, flat, linear, grass-like leaves, proceeding chiefly from the bulbs; and is terminated by a mixed cluster of flowers and bulbs, inclosed in a spathe, which opens at one side and withers. The flowers are small, consisting of six oblong white petals, with tapering filaments, shorter than the corolla, and supporting erect anthers: the germen is superior, short, angular, bearing a simple style with a sharp stigma; and becoming a short, broad, three-celled capsule, containing roundish seeds.

Garlic is dug up for use in the month of August, then cleaned and dried in the sun, and generally preserved in bunches in a dry place. In this state the exterior membrane is of a dirty white colour, and of a withered aspect; but the bulbs, which are called *cloves,* are white, succulent and juicy. On drying, they lose nine parts in fifteen of their weight.

Qualities. — All the parts of the plant, but particularly the bulbs, have a pungent offensive odour, and an acrimonious biting taste. These properties depend on an essential oil, that can be obtained separate by distillation with water; of a thick and ropy consistence, a yellow colour, heavier than water, and possessing in an eminent degree the sensible qualities of the garlic. It blisters the skin when applied to it, and strikes a black colour when triturated with oxide of iron. Simple coction with water renders garlic mild and inert. The acrimony is obtained with the juice by expression: and it is in a less degree extracted by water, by alcohol,[1] and by acetic acid. The odour is so penetrating, that when garlic is applied to the soles of the feet it is perceived in the breath, the urine, and the perspiration. From 1406 parts of fresh garlic, Cadet[2] obtained 520 of mucilage, 37 of albumen, 48 of fibrous matter, and 801 of water by estimate. Bouillon la Grange[3] found, besides, in it sulphur, vegetable albumen, and sugar.

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[1] Σκοροδον Dioscoridis.

[2] The root, strictly speaking, is not the part of the plant intended to be ordered. This error has arisen from the bulbs of plants having been generally placed by botanists among the roots, under the title "radices bulbosæ:" they however have no affinity to roots, but the closest to leaf-buds. The roots of bulbous plants are fibrous, and issue from a radical plate at the bottom of the bulb. The clearest definition of the bulb is given by Gærtner, in his work *De Fructibus, &c.* Introduc. p. 111. "Bulbus est germen compositum, subglobosum, subaphyllum, ex carina brevissima, et squamis succulentis crassis compaginatum, quod tandem sponte a matre sua solvitur." The Colleges, therefore, should have used the word *bulbus* instead of *radix.*

Medical properties and uses.—Garlic is stimulant, diaphoretic, expectorant, diuretic, and anthelmintic, when exhibited internally; and rubifacient when externally applied.

It has been successfully given in intermittents, and in fevers of the typhoid type. If the body be kept warm during its use, it acts powerfully by diaphoresis. It has long been esteemed a valuable remedy in pituitous asthma, chronic catarrh, flatulent colic, calculus, and dropsies; and as a preventive of worms. Externally it is applied bruised to the soles of the feet, in the coma of typhus; and in confluent small-pox when the determination to the head is considerable. A poultice made of it is a good resolvent of indolent tumours. A clove of it, wrapped in cotton or gauze, or a few drops of the juice introduced into the external ear, is said to be extremely efficacious in atonic deafness; and applied to the pubis as a poultice in retention of urine, owing to a want of action in the bladder, it sometimes is effectual in renewing the discharge. The juice is also applied united with oil to herpetic eruptions.

Garlic may be exhibited in substance, the whole clove or pieces of it being dipped in oil and swallowed; or it may be formed into pills. The expressed juice also is given mixed with sugar: or the bulb may be infused in milk, which was Rosenstein's mode of administering it to children afflicted with worms. It is frequently united with calomel in the form of pill or bolus, in hydropic cases. An ointment is formed by mixing the juice with oil. The bruised bulb has also been used as a suppurative.

The dose in substance is from ʒj to ʒij; or from one to six cloves swallowed whole, twice or thrice a day; and in pills, united with soap or calomel, from grs. xv to ℈j. Of the juice, fʒss is given for a dose in any proper vehicle.

An over-dose, or the too liberal use of it as a condiment, is apt to occasion head-ache, flatulence, thirst, fever, inflammation, and discharges of blood from the hæmorrhoidal vessels.

Officinal preparation. *Syrupus Allii.* D.

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[1] With alcohol, a reddish yellow tincture is obtained, which leaves, when evaporated, a very acrid brown extract, that attracts moisture from the air.

[2] *Ann. de Chimie.* lix. p. 106.

[3] *Journ. de Pharm.* No. viii. p. 357.

2. ALLIUM CEPA.[1]

Officinal. CEPA; RADIX. *Dub.* The Onion.

Syn. Ognon (*F.*) Swiebel (*G.*) Cipolla (*I.*) Cebolla (*S.*) Palandoo (*San.*) Pecáj (*H.*) Bassul (*A.*)

The onion is also a perennial bulbous plant, cultivated all over Europe for culinary purposes: flowering in June. It is so well known as scarcely to require a particular description. The bulb is simple, formed of concentric circles, with a radical plate at the bottom, and fibrous roots. The stem is a naked, swelling scape, with fistular, pointed, spreading leaves, sheathing at the base. The flowers are produced in a capital or head, inclosed in a deciduous spathe.

Qualities. — The odour and taste of the onion do not materially differ from those of garlic, but are much weaker. A little acrid, volatile essential oil combined with sulphur[2] is obtained by distillation; and the recent juice contains sugar, mucus, phosphoric acid, phosphate of lime, and citrate of lime.[3]

Medical properties and uses. — The onion is " considered rather as an article of food than of medicine; when eaten liberally, it is said to produce flatulencies, occasion thirst, head-aches, and turbulent dreams." As a medicine it is stimulant, diuretic, and expectorant; and may be used in the same cases as garlic. On account of the free phosphoric acid it contains, the juice is supposed to be useful in calculous cases, as it dissolves phosphate of lime out of the body. Onions are, however, scarcely ever employed, except externally, as suppurative cataplasms; for which purpose they are generally roasted, split, and applied to tumours.

ALOE. *Spec. Plant. Willd.* ii. 184.

Cl. 6. *Ord.* 1. Hexandria Monogynia. *Nat. ord.* Coronariæ *Linn.* Asphodeli *Juss.*

G. 659. *Corolla* erect, mouth spreading, bottom nectariferous. *Filaments* inserted into the receptacle.

Species 2. Aloe *spicata.* Spiked Aloe.
3. Aloe *vulgaris.* Common Aloe. *Sibthorp. Flor. Græc.*

1. ALOE SPICATA.

Officinal. ALOES SPICATÆ EXTRACTUM. *Lond.* ALOES EXTRACTUM *Edin. Dub.* Extract of Aloes.

Syn. Suc. d'Aloes (*F.*) Glausinde Aloe (*G.*) Aloe (*I.*) Aloe (*S.*) Elwa (*H.*) Musebber (*A.*)

The spiked aloe is undoubtedly the species which yields the best extract brought from the Cape of Good Hope; and it is also supposed to yield the extract brought from the island of Socotora; which was formerly the only place of export for the

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[1] Derived from *caput*, a head, on account of the form of its bulb.

[2] It is this sulphuretted oil which blackens silver plate in which onions are placed; and which occasions the disagreeable odour of this bulb in putrefying.

[3] Fourcroy and Vauquelin, *Ann. de Chim.* lxv. 161.

best aloes, thence named Socotrine aloes. It grows abundantly in the interior of the Cape, particularly at Zwellendam near Mossel Bay. The stem is round, about four inches in diameter, rising three or four feet in height, and leafy at the top. The leaves are spreading, about two feet long, subverticillate, broad at the base, gradually drawn to a point, channelled, acute with remote teeth. The flowers spread horizontally, in very close spikes, a foot in breadth. Under each flower is a single ovate, acute, broad, membranaceous bracte, white with three green streaks, and a little shorter than the corolla. This is bell-shaped, and six-petalled: the three inner segments are white marked with three green lines, not connected together, ovate, blunt, and broader than the three outer; which are connected with them at the base, and resemble them, but are narrower and less concave. The flower contains a large portion of a purple honey juice. The seeds, which are numerous, with a membranaceous membrane attached to each, are contained in a superior capsule.

At the island of Socotora the leaves are cut off close to the stem, then cut in pieces, and the juice expressed: this is allowed to remain at rest for forty-eight hours, during which time a feculent matter is deposited; after which the supernatant liquor is poured off into flat dishes and evaporated in the sun. At Zwellendam, in the month of July, the leaves are pulled, then cut into pieces, the juice expressed, and inspissated by means of heat.

The real Socotrine aloes, which are now scarce in the market, and supposed to come from the island of Socotora, or Zocotora, near the straits of Babelmandel, are brought to this country by way of Smyrna and Malta, in chests and casks. Those from the Cape are brought in similar packages. The greater part of what are now sold as Socotrine aloes, are brought from Bombay, and are the real Hepatic aloes. The Bombay aloes are rather duller and browner, but in other respects have nearly the same characters as the Socotrine, which are sometimes mixed with the Indian. They are imported in casks containing from two to eight hundred weight, and sometimes in skins.[1]

Qualities. — The real *Socotrine* extract has a peculiar aromatic odour, not unlike that of the russet apple decaying; and a very permanent intensely bitter taste. It is in pieces of a deep reddish-brown colour, glossy as if varnished; breaking with a smooth conchoidal fracture. The thin edges and small fragments are reddish or golden yellow and semitransparent. It softens in the hand, and is adhesive; yet is sufficiently pulverulent; and the powder has a bright golden yellow hue.

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[1] Mr. Barrow states that the quantity of Cape aloes sent to London, from 1799 to 1802 inclusive, was 341,927 lbs. Vide *Travels in Africa.*

The *Cape* aloes have a stronger and more disagreeable odour than the Socotrine and Hepatic; the taste is nearly the same. The outside of the pieces is more friable, has more of a yellow cast, and is less glossy; but the inside is apt to continue soft and pliable. The colour of the powder is a beautiful greenish yellow, resembling gamboge, but less bright. They are imported in chests and casks.

2. ALOE VULGARIS.[1]

Officinal. ALOES VULGARIS EXTRACTUM. *Lond.* ALOE HEPATICA; EXTRACTUM. *Edin.* GUMMI RESINA. *Dub.* Extract of the Common Aloe, or Barbadoes Aloes.

The British Pharmacopœias formerly considered the plant which yields the Barbadoes aloes as a variety of the Aloe *perfoliata;* but the London College, on the authority of Sir E. Smith, the learned editor of Sibthorp's *Flora Græca*, has marked the above-named plant, which is a distinct species, as the one that Sloane describes in his History of Jamaica as producing the Barbadoes extract. The volume of Sibthorp's work, in which the plant will be fully described, and proved to be the true Αλοη of Dioscorides, is yet unpublished, and therefore we cannot avail ourselves of the description.

The month of March is the period for cutting the aloes in the island of Barbadoes. The leaves are cut off close to the stem, and disposed in tubs, in such a manner that the juice runs out. After a sufficient quantity of it is collected, it is exposed to heat in copper boilers; and as it becomes more inspissated by a constant and regular fire, it is ladled from one boiler to another, and fresh juice added, until that in the last, which is called the *teache*, acquires the consistence of honey; when it is poured into calabashes, and hardens by age. It is brought home in these calabashes, or large gourd-shells, which contain from six to seventy pounds each. They are often passed off as Hepatic aloes.

There is still another kind of aloes, named Fœtid or Caballine, but on account of its fœtid odour it is not used in medicine: and a Mocha aloe resembling the Cape, but less purgative.

Qualities.—The odour of the Barbadoes aloes is stronger and less pleasant than that of the Socotrine, and has some resemblance to the odour from the human axilla. The taste is nauseous and intensely bitter. The pieces are also of a duller brown colour, less glossy, not so smooth in the fracture, but easily splinter. The edges are not so sharp and transparent; but rather blunt, and of a dull yellowish hue. It softens in the hand, and is adhesive. The colour of the powder is a dull olive yellow.

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[1] Αγοη Dioscoridis, l. 3. c. 25.

All the kinds of aloes, when analysed, yield a small portion of vegetable mucus, resin, and a peculiar extractive matter. Braconnot found aloes to consist chiefly of a peculiar bitter matter, which he has termed the resinous bitter principle.[1] The odour, taste, and medical virtues of the drug reside chiefly in the extractive; and the superiority of the Socotrine and Cape and Bombay aloes is correctly supposed to arise from their containing a larger proportion of it, and consequently less resin, than the Barbadoes. Boiling water dissolves nearly the whole of any of the kinds; but as the solution cools, the resinous part is deposited; and by boiling aloes in water the extractive is altered, rendered insoluble in water, and approaches in its properties to the nature of resin. When the Socotrine aloe is distilled, a volatile oil is obtained, which is not procured from the Barbadoes.

Medical properties and uses.—Although all these kinds of aloes differ in their sensible qualities, yet they agree in their medical properties. They are warm, stimulating cathartics, acting chiefly on the colon and rectum, and thence producing, by the extension of their stimulus to the uterine vessels, emmenagogue effects. This operation is slow and moderate, but tolerably certain. From the stimulant property of aloes, they are useful in cases where the intestines are in a sluggish, relaxed, and insensible state, attended with viscidity of the abdominal secretions: as in the habitual costiveness of the sedentary and hypochondriacal; or that arising from a paucity of bile, in jaundice, chlorosis, and scrophula: and by their powerful effects on the rectum they have been found very serviceable in expelling ascarides. Their use is contraindicated in hæmorrhoidal cases, the symptoms of which they are apt to aggravate; and also in very irritable and plethoric constitutions, in phthisis pulmonalis, and during the flow of the menses. Aloes, and aloetic compounds, have been likewise regarded as improper in pregnancy; but Dr. Denman has justly remarked, that "they are in common use among the lower class of people, because they are cheap, and conveniently given in the form of pills;[2]" and no bad effects are observed to follow.

Aloes may be given in substance, in doses from grs. iij to grs. xx; larger doses not operating more effectually. Whether in the simple state, or when compounded with soap, bitters, and other substances, the form of pill is to be preferred on account of the nauseous taste of the medicine.

Officinal preparations. *Pulvis aloes comp.* L. *Pilulæ aloes.* E. D. *Pil. aloes comp.* L. *Pil. aloes cum myrrha.* L. E. D. *Pilul. aloes et assafœtidæ.* E. *Pil. scammonii comp. cum aloe.* D. *Decoctum aloes comp.* L. *Extractum aloes.* L. D. *Tinctura aloes.* L. E. D. *Tinct.*

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[1] *Ann. de Chimie,* lv. 152.

[2] *Introduction to Midwifery,* vol. i. 287.

aloes comp. L. E. D. *Tinct. aloes ætherea.* E. *Tinct. rhei et aloes.* E. *Vinum aloes.* L. E. D.

ALTHÆA.[1] *Spec. Plant. Willd.* iii. 770.

Cl. 16. *Ord.* 8. Monadelphia Polyandria. *Nat. ord.* Columniferæ *Linn.* Malvaceæ *Juss.*

G. 1289. *Cal.* double; the exterior 6 or 9-cleft. *Caps.* numerous, 1-seeded.

Sp. 1. A. *officinalis.* Common Marsh Mallow. *Med. Bot. 2d edit.* 552. *t.* 198. *Eng. Bot. t.* 147. *Smith's Flora Britan.* 3. 739.

Officinal. ALTHÆÆ FOLIA, ET RADIX. *Lond.* —— RADIX. *Edin.* The leaves and root of Marshmallow.

Syn. Guimauve (*F.*) Eibisch (*G.*) Altea (*I.*) Malvarisco (*S.*)

The marshmallow is an indigenous plant, which grows, as its name imports, in marshy places, particularly salt-marshes, and on the banks of rivers, throughout Europe. It flowers in June and July, and ripens its seeds in September. The root is perennial and fusiform. The stems are annual, herbaceous, upright, rising from two to three feet in height, round, naked and purplish below, but leafy and branching above. The leaves are alternate and petiolate, longer than they are broad, slightly five-lobed, and unequally serrated: both surfaces are downy, and give a soft velvety feeling when rubbed between the fingers. From the axillæ of the leaves the flowers spring in short thick panicles. Both the calyxes are persistent; the exterior has 7, 9, 10, or 12 very narrow unequal divisions; the interior is more regularly, but less deeply, cleft into five broader and sharper segments. The petals are five, cordate, coalescing at their bases, of a pale blush colour. The stamens are many, united at their bases into a tube, and support reniform anthers. The germen is orbicular, bearing a cylindrical style, divided into many stigmas, which rise above the anthers. The capsules, generally about twenty in number, are of a rounded kidney shape, united laterally in a circle, so as to form a flattened wheel-shaped seed-vessel; and each contains a solitary reniform, flattened, smooth, brown seed. The roots, which are the parts medicinally used, are dug up in autumn.

Qualities.—Marshmallow root is inodorous, mucilaginous when chewed, externally tough and of a yellowish colour, internally white and fibrous; and contains a very considerable portion of mucus,[2] which is yielded to water by coction.

Medical use.—The preparations of this plant, which derive their virtues from its mucus, are useful demulcents in visceral inflammations and calculous complaints. The roots well boiled, and bruised, are sometimes used as an emollient suppurative cataplasm; and a decoction of the leaves forms a useful fomentation in external abrasions; and in cutaneous eruptions accompanied with a sharp ichorous discharge.

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[1] Αγϑαια Dioscoridis.

[2] Mucus differs from mucilage of gum arabic, in not being precipitated by silicated potash, nor affected by red or oxysulphate of iron. Bostock. *Nicholson's Journ.* xviii. 31.

Officinal preparations. *Decoctum althææ officinalis.* E. *Syrupus althææ.* L. E.

ALUMEN. *Lond. Edin. Dub.* Alum.

Syn. Alun (*F.*) Alaun (*G.*) Allume (*I.*) Alumbre (*S.*) Sp'hatica (*San.*) P'hitcari (*H.*) Shub (*Arab.*)

This salt is a ternary compound of alumina, potash, and sulphuric acid. It is found native in some places, either effloresced on bituminous schistus, as at Göttwig in Austria; or united with the soil in volcanic regions, as at the Solfatara near Naples, where the only processes requisite for its extraction are lixiviation and evaporation.[1] But the greater quantity of the alum of commerce is prepared by a peculiar management of schistose pyritic clays, usually denominated alum ores. At La Tolfa, near Civita Vecchia, where the best Roman alum is made, the ore is *alum stone* found in large stratified masses among compact iron-shot argillaceous limestone;[2] but at other places, both on the continent and in Great Britain, it is *alum slate*, which occurs amorphous, or in concentric balls. At Hurlett, near Glasgow, the largest alum mine in this country, the schistus lies ten inches thick above coal.

To prepare the alum, the ore is properly exposed to the atmosphere, when the sulphur of the sulphuret of iron present in it is oxigenized by the air, and converted into sulphuric acid, which combining with the alumina, the alum effloresces. In general, however, the ore is first calcined with a low heat, so as to destroy the bituminous matter of the slate, and partly convert the sulphur into sulphuric acid: the oxigenizement is then completed by exposing the roasted ore to air and moisture, by which means a supersulphate of alumina is formed, which is extracted by lixiviation. To the solution concentrated, is added the impure subcarbonate of potash of commerce, or supersulphate of potash or putrid urine, or muriate of potash; and by evaporation the alum is obtained.

Although the ancients were certainly acquainted with alum, yet the first regular works appear to have been established by the Asiatics, in the middle ages, particularly at Roccha in Syria, whence the name *Roch alum*, and from them Europe was supplied till the fifteenth century. After this period, works were begun at Tolfa in Italy, in Germany, and Spain; and in England, in the reign of Elizabeth, by Sir Thomas Chaloner, who established the first alum work in England at Gisborough, in

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[1] These processes are performed in pans sunk in the ground, the heat of which is sufficient to carry on the evaporation. [2] An alum is found near Moscow which contains much sulphate of iron. *Mem. de la Soc. Imp. de Moscow,* t. i. p. 22.

Yorkshire. The largest manufacturers of alum at present, in this country, are Lords Dundas and Mulgrave, at Whitby, in Yorkshire.

The best alum is the Roman, which is in irregular octahedral crystalline masses, powdery on the surface: the English is in large, irregular, semitransparent, colourless masses, having a glassy fracture, not efflorescent, and difficult to pulverize; and that from the Levant, or Roch alum, is in small morsels, about the size of an almond, rather friable, and of a pale rose colour. The form of the regular crystal of alum is an octahedron. Its specific gravity is 1·7109. According to Vauquelin, its constituents are, acid 30·52, alumina 10·50, potash 10·40, and water 48·58, in 100 parts: but by a more recent analysis, Berzelius makes them sulphate of alumina 36·85, sulphate of potash 18·15, and water 45·00; but it also generally contains ammonia; and none of the alum of commerce, except the Roman, is free from a minute portion of iron.

Qualities — Alum is inodorous, and has a sweetish, acidulous, astringent taste. It reddens vegetable blues, owing to the excess of its acid;[1] is in a small degree efflorescent; and soluble in sixteen parts of water at 60°, and in three-fourths of its weight of boiling water. When exposed to a gentle heat it undergoes the watery fusion, and in a stronger heat swells, loses 44 per cent. of its weight, which is water, and becomes an opaque, white, friable spongy mass. It is decomposed by the alkalies and alkaline earths, which attract the greater part of its acid, and precipitate the alumina united with a small portion of acid and potash. Gallic acid also precipitates its earth: hence the alkalies and their carbonates, magnesia, lime, carbonate of magnesia, chalk, and infusions of galls are incompatible in prescriptions with solutions of alum; as is also the superacetate of lead.

Medical properties and uses. — Alum is a powerful astringent. It is used both as an internal and external remedy for restraining violent hæmorrhages; and also in cases of obstinate diarrhœa, diabetes, and fluor albus; but we agree with Dr. Cullen, that it is not to be depended upon in the two latter diseases. It has been recommended as an auxiliary to cinchona in intermittents, and in confluent small-pox when the pustules are bloody; and Dr. Percival regarded it as a prophylactic in colica pictonum, and a cure for slighter cases.[2] It is used locally in gargles, in cases of cynanche, relaxation of the uvula, and aphthæ; and as the basis of injections, in cases of gleet and leucorrhœa, and of collyria in chronic ophthalmia.

The dose in hæmorrhages is from grs. v to ℈j, repeated every hour or two till the bleeding abates: in other cases smaller doses are more advisable; larger being apt to nauseate the stomach, and occasion violent constipation. The addition, however, of an aromatic, prevents it, to a certain degree, from exciting nausea. It is sometimes administered dissolved in the serum of milk, in the form of whey, (*serum lactis aluminosum,*) which is prepared by boiling ʒij of powdered alum in a pint of milk, and straining. The dose of the whey is f℥ij or f℥iij.

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[1] Much of the English alum we have lately examined strikes a green with syrup of violets.

[2] *Observations on Lead, &c.*

Officinal preparations. *Alumen exsiccatum.* L. E. D. *Liquor aluminis comp.* L. *Pulvis aluminis comp.* E.

AMMONIÆ MURIAS. *Lond.* MURIAS AMMONIÆ. *Edin.* SAL AMMONIACUM. *Dub.* Muriate of Ammonia.

Syn. Sel Ammoniac (*F.*) Salmiak (*G.*) Sale Ammoniaco (*I.*) Sal Armoniaco (*S.*) Nosader (*H.*)

This salt, which is a compound of muriatic acid and ammonia, is found in small quantities as a product of volcanoes; but for the purposes of medicine and the arts it is artificially prepared.

Muriate of ammonia was originally manufactured in Egypt, by sublimation from the soot of fuel, formed of the dung of phytivorous animals kneaded with straw into clods, and dried in the sun. From this source all the European states were formerly supplied: but since the manufacture of it in Europe, begun about sixty years ago, the importation of Egyptian sal ammoniac has been discontinued. The process differs in different places, and is generally kept secret; but the following is a sketch of the actual practice at a large establishment, which was carried on some years ago near London, and is probably the mode usually adopted in this country.[1]

Bones, chopped into small pieces, and boiled in order to extract the marrow and fat, were distilled from an iron cylindrical still into a leaden receiver, cooled by a refrigeratory, which was its cover, and contained about four inches in depth of water. Six parts of impure alkaline liquor and five of fœtid oil were thus procured; the oil was skimmed off, and the alkali mixed with pulverized gypsum. By double decomposition sulphate of ammonia and carbonate of lime were thus formed; the liquor which contained the former was then mixed with common salt (*muriate of soda*); and thus, by a second decomposition, the sulphuric acid of the sulphate of ammonia uniting with the soda of the muriate of soda, and the muriatic acid with the ammonia, muriate of ammonia and sulphate of soda were formed in the liquor. This solution was clarified by subsidence and decantation; and by a skilfully managed evaporation in leaden boilers, the two salts were separated as they crystallized. The water of crystallization was then driven off from the muriate of ammonia, by exposing it to heat in a kind of oven; and the spongy, friable, ash-coloured mass, into which it changed, was put, while hot, into globular bottles, or glazed earthen jars furnished with a moveable perforated cover, in which the muriate was sublimed by exposing them to a heat of 320° in iron pots filled with sand. The cakes of salt produced, after being placed "for a day or two in a damp atmosphere," to soften their surface, and facilitate "the removal of any superficial impurities," were packed in casks for sale. As soot of coal affords, by maceration in water, a quantity of sulphate of ammonia, it is used in the Scotch manufactories instead of bones.

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[1] Aikin's *Dictionary of Chemistry*, art. Sal ammoniac.

The cakes of muriate of ammonia are hemispherical, about an inch thick; elastic; and when broken are towards the convex surface white, striated and opaque; but towards the concave, have a more crystallized appearance, and are nearly semi-transparent. It is also sometimes crystallized in conical masses, that are deliquescent, owing to the presence of muriate of lime, which renders it unfit for medicinal purposes.

The greater part of the sal ammoniac in the London market is made in the north of England; but an inferior sort is imported in chests from the East Indies.

Qualities. — This salt is inodorous; has a salt, bitterish, acrid and cool taste; very slightly attracts moisture from the air; and has a specific gravity of 1·450. It is rather ductile, and therefore not very easily pulverized. It requires 3·25 times its weight of water at 60°, and its own weight at 212°, to dissolve it; and during its solution a great reduction of temperature takes place. At a high temperature it sublimes without melting, and is unchanged. When dissolved in boiling water, it forms, as the solution cools, in tetrahedral, pyramidal, or in flaky, plumose crystals. Its components are 31·95 of ammonia, 49·55 of acid, and 18·50 of water.[1] The sulphuric and nitric acids unite with its alkali, and set free the muriatic acid. Potass and its carbonate, carbonate of soda, barytes, strontites, lime, chalk, magnesia, carbonate of magnesia, combine with its acid, and set free the ammonia: and superacetate of lead, when added to a solution of it, throws down a precipitate of muriate of lead: hence these salts are incompatible in prescriptions with muriate of ammonia.

Medical properties and uses. — This salt was formerly considered a powerful aperient and attenuant of viscid humours, acting as a diaphoretic, diuretic, purgative, and emetic, according to the mode of exhibition, or its dose; but it is now scarcely ever ordered as an internal medicine. Externally, it is advantageously employed, on account of the cold produced during its solution in water, to abate the pain and heat of inflammation, and to allay violent head-ache; also in cases of mania, plethoric apoplexy, injuries of the head; and to assist in the reduction of hernial tumors. It is also a useful application in dropsy of the thyroid gland.[1] Owing to its stimulant qualities, it forms an excellent discutient, when dissolved in the proportion of ʒj of the salt, in fʒix of water, with fʒj of alcohol, in indolent tumors, gangrene, scabies, and chilblains; and as a gargle, it is occasionally useful in cynanche.

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[1] Berzelius.

Off. prep. *Ammoniæ subcarbonas*. L. E. D. *Liquor Ammoniæ*. L. *Aqua ammoniæ*. E. D. *Hydrarg. præcip. alb*. L. *Alcohol ammoniatum*. E. D. *Ferrum ammoniatum*. L. E. D. *Aqua cupri ammoniati*. D. *Sulphuret. ammoniæ*. D. *Murias ammoniæ et ferri*. D.

AMMONI'ACUM. Vide *Heracleum gummiferum*.

AMY'GDALUS. *Spec. Plant. Willd.* ii. 982.

Cl. 12. *Ord.* 1. Icosandria Monogynia. *Nat. ord.* Pomaceæ *Linn.* Rosaceæ *Juss.*

G. 981. *Cal.* 5-cleft, inferior, *Pet.* 5. *Drupe* with a nut perforated.

Sp. 2. A. *communis*. The Common Almond-tree. *Med. Bot. 2d edit. t.* 183.

Varieties. β. Amygdalus *sativa*. Sweet Almond-tree.
γ. Amygdalus *amara*. Bitter Almond-tree.

Officinal. AMYGDALÆ AMARÆ.—DULCES. *Lond.* AMYGDALI COMMUNIS NUCLEI. *Edin.* AMYGDALÆ DULCES. *Dub.* Bitter and Sweet Almonds.

Syn. Amandes douces et ameres (*F.*) Bittere und Süsse Mandeln (*G.*) Mandorli dolce ed amare (*I.*) Almendra (*S.*) Bādāmie Farsie (*Hind.*) Lowz (*A.*)

The almond-tree is a native of Syria and Barbary; but it is now naturalized in the south of Europe, and even in England[2]; where, however, the fruit seldom ripens. The flowers display themselves in March and April before the leaves are expanded. It rises to the height of twenty feet, and divides into many spreading branches, which are covered with a dark grey bark. The leaves stand upon short foot stalks, are about three inches long, and three-fourths of an inch broad, elliptical, pointed at both ends, minutely serrated, with the lower serratures glandular, and of a bright green colour. The flowers, which are supported on very short peduncles, are of a pale rose or blush colour, varying to white: the calyx is tubular, with the lip divided into five blunt segments; the petals are five, oval, and convex; the filaments about thirty, inserted into the calyx, tapering, spreading, of unequal lengths, and furnished with orange-coloured, simple anthers: the germen is downy, with a simple style, supporting a round stigma. The fruit is of the peach kind, but flatter, with a tough coriaceous covering instead of the rich pulp of the peach, which opens spontaneously at the longitudinal furrow when ripe. The kernel or almond, which is inclosed in a tender, thick, brittle, spongy shell, is oblong, flattish, rounded at one end and pointed at the other, and composed of two white cotyledons enveloped with a thin, pale brown, veined, bitter skin, covered with an acrid meal.

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[1] *Burns on the Anat. of the Neck*, p. 191.

[2] It was cultivated in England by Lobel before 1570.

These two varieties of the Amygdalus *communis* are not distinguished from each other, but by the taste of the kernel of their fruit. The *Valentia* almond is a sweet, large, flat almond, pointed at one extremity, and compressed in the middle as if with the thumb. The *Italian* are not so sweet, smaller, and less depressed in the middle. The *Jordan* almonds, which come from Malaga, and are the best sweet almonds brought to England, are said to be the produce of a distinct species of Amygdalus. They are longer, flatter, less pointed at one end, and less round at the other, and have a paler cuticle than those we have described.

Sweet almonds are imported in mats, casks, and cases: the bitter, which come chiefly from Mogadore, arrive in boxes.

When the almond is not well preserved, it is preyed on by an insect that eats out the internal part; or, if this does not happen, the oil it contains is apt to become rancid.

Qualities. — The cuticle of both kinds of almonds has an unpleasant bitterish austere taste; but it is easily detached by putting the almonds into boiling water; and thus decorticated they are said to be blanched.

The blanched *sweet almond* is inodorous; has a sweet, pleasant, bland taste: and consists chiefly of fixed oil, mucus, saccharine matter, and albumen. When eaten as food, it is not very digestible, and requires to be well masticated. The *bitter almond* is also inodorous when entire, but when triturated with water has the odour of the peach blossom; and the taste is the pleasant bitter of the peach kernel. It contains less fixed oil and more albumen than the sweet, and besides a portion of prussic acid,[1] upon which its narcotic power is supposed to depend. It is said to operate as a poison on dogs and some other animals, but not generally on the human species. The fixed oil that both varieties yield by expression in large quantity is insipid, inodorous when heat has not been employed.

Medical properties and uses. — Sweet almonds are used more as food than as medicine; but they afford little nourishment. Heartburn is said to be relieved by eating six or eight of them decorticated. When triturated with water, milky mixtures or emulsions are formed, which shall be afterwards noticed; and they are also used in pharmacy for assisting by trituration the combination of some substances, such as camphor and the resins, with water. Bitter almonds are scarcely ever used medicinally, although Bergius[1] mentions a case of intermittent having been cured by them, when the Peruvian bark had failed. Owing to a peculiar idiosyncrasy of some habits, the smallest quantity produces urticaria, and other unpleasant effects.

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[1] This was discovered by Bohn, who found that when potash was added to the water distilled from the bitter almond, solution of sulphat of iron threw down a blue precipitate, the sure test of prussic acid. Murray's *Chemistry*, iv. 342.

Officinal preparations, *Oleum amygdalæ.* L. E. D. *Emulsio amygdalæ comp.* E. D. *Emulsio acaciæ arabicæ.* E. D. *Emulsio camphoræ.* E. *Confectio amygdalarum.* L.

AMY'LUM. Vide *Triticum hybernum.*

AMYRIS. *Spec. Plant. Willd.* ii. 333.

Cl. 8. *Ord.* 1. Octandria Monogynia. *Nat. ord.* Terebintaceæ *Juss.*

G. 755. *Cal.* 4-toothed. *Pet.* 4 oblong. *Stig.* 4-cornered. *Berry* drupaceous.

Spec. 2. Amyris *elemifera.* Elemi tree.

Spec. 6. Amyris *gileadensis.* Balsam of Gilead tree. *Med. Bot.* 2d *ed.* 603. *t.* 214. *Bruce's Abyssinia, vol.* v. *p.* 16. *t.* 2, 3.

1. AMYRIS ELEMIFERA.

Officinal. ELEMI. *Lond.* ELEMI; RESINA. *Dub.* Elemi.

Syn. Eleme (*F. G. I.*)

The elemi tree, of the botanical characters of which we know very little, is a native of Carolina and the Brazils. It does not, according to Catesby, rise to a great height; and the trunk is small, and covered with a grey bark. The leaves are opposite, on footstalks; ternate and sometimes pinnate; with stiff, pointed leaflets of a bright green colour, shining, and downy underneath. The flowers are in terminal corymbs; small, white, with the petals inflex at the tips. The fruit is the size and figure of an olive.

The resin is obtained by making incisions in the bark in dry weather; and is left to dry in the sun as it exudes. It used to be brought from Turkey in long roundish cakes, wrapped in flag leaves; but the elemi now brought, comes in mats and chests, each containing from four to six pounds weight.

Qualities.—True elemi has a fragrant, aromatic odour, not unlike that of fennel seeds, but stronger. The taste is very slightly bitter, and warm. The cakes are of a pale yellow colour, semitransparent, brittle on the outside, soft and tenacious within, and very fusible. Spec. grav. 1·0182. When distilled with water, it affords $\frac{1}{16}$ of a thin pale-coloured essential oil, on which its fragrance and softness depend; and the residue is a brittle, inodorous resin. Alcohol dissolves the greater part of elemi; but a white flaky, inodorous matter remains, which is almost entirely soluble in water; hence we may consider the constituents of elemi to be gum, resin, and essential oil. But no true elemi is now to be found in the shops.

Medical properties and uses.—This resin is stimulant, but is very rarely used as an internal remedy, being chiefly employed for forming the mild digestive ointment which bears its name.

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[1] *Mat. Med.* art. Amygdalus.

Officinal preparation. *Unguentum elemi compositum.* L. D.

2. AMYRIS GILEADENSIS.

Officinal. ——, RESINA LIQUIDA. *Edin.* Balsam of Gilead.

Syn. Balsamier de la Mecque (*F.*) Opobalsamo (*I.*) Balsamo (*S.*) Akooycelarsemoonroome (*Arab.*)

This species of amyris is a native of Abyssinia, growing, according to Bruce, among the myrrh-trees behind Azab, all along the coast to the Straits of Babelmandel.[1] It appears, however, to have been transplanted into Judea 1730 years before Christ; and as it was from Gilead in Judea that the merchants brought its resinous product, in early times, to Egypt, it thence derived its appellation *Balessan*, or *Balsam of Gilead.*

This tree rises above fourteen feet in height; has a flat top and stunted aspect, with many spreading, crooked branches going off nearly at right angles; the wood is light, open, and covered with a smooth bluish white bark. The leaves are thinly scattered, small, composed of one or two pair of opposite leaflets, with an odd one; these are obovate, entire, veined, and of a bright green colour. The flowers are white, appearing upon the young shoots, three upon one stalk; but two generally drop, and one only produces fruit. The calyx is permanent, divided into four expanded sharp teeth: the petals are four, oblong, concave, spreading: the filaments eight, erect, supporting oblong anthers: the germen is superior, ovate, with a thick style, the length of the filaments, crowned with a quadrangular stigma. The fruit opens with four valves, and contains a smooth nut.

The ancients held the balsam obtained from this tree in great esteem, but it does not appear that they were well acquainted with the tree itself. To obtain the balsam, the bark is "cut by an ax, when the juice is in its strongest circulation, in July, August, and the beginning of September. It is then received into a small earthen bottle, and every day's produce gathered and poured into a larger, which is kept closely corked." The first that flows, called opobalsamum,[2] "is of a light yellow colour, apparently turbid." It afterwards becomes clear, fixed, and heavier; and the colour by degrees deepens to a golden yellow. The opobalsamum of the ancients was the green liquor found in the kernel of the fruit: the carpobalsamum, the next in esteem, was made by the expression of the ripe fruit; and xylobalsamum, or the worst kind, by the expression or decoction of the small twigs.

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[1] *Bruce's Abyss.* App. p. 16. The whole of Mr. Bruce's account of this tree is highly interesting, and we regard his authority undoubted.

[2] Willdenow has a distinct species under the name Amyris *opobalsamum*; but, in a note, says — "sunt forte non distinctæ species, sed varietates ab ætate vel solo ortæ." *Spec. Plant.* vol. ii. p. 334.

The real balsam rarely finds its way into this country, dried Canada balsam being generally substituted for it; but it wants the peculiar odour of the true balsam.

Qualities. — The odour is at first violent and strongly pungent; but the pungency is lost by exposure to the air and age; and the balsam gradually acquires the consistence of turpentine. The colour is yellowish exteriorly, and paler in the inside, the taste is acrid, rough, and pungent. When pure it dissolves easily in water.

Medical properties and uses. — This balsam was esteemed in the earlier ages as a medicine possessed of almost universal virtues; and at the present day the Arabs use it "in all complaints of the stomach and bowels," reckoning it a powerful antiseptic, and preventive of the plague. Its chief use, however, is as a cosmetic by the Turkish ladies. It is never brought genuine to this country; and we know not why the Edinburgh College retain it in the list of Materia Medica.

ANCHUSA.[1] *Spec. Plant. Willd.* i. 756.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Asperifoliæ *Linn.* Borragineæ *Juss.*

G. 277. *Corolla* funnel-shaped. The throat closed with arches. *Seed* engraved at the base.

Spec. 7. Anchusa *tinctoria.* Dyer's Alkanet. Lobel. *Icon.* 578.

Officinal. —, RADIX. *Edin.* ANCHUSA; RADIX. *Dub.* Alkanet root.

Syn. Orcanette (*F.*) Alcanna (*I.*)

This species of anchusa is perennial, a native of the south of Europe; where it is cultivated in great abundance, particularly near Montpelier. It is found in our gardens as an ornamental plant; but its roots do not acquire in Britain the beautiful colour for which the foreign are prized. It flowers from June until October. The root is long, round, fibrous, white within, and covered with a purplish red bark. The stem rises eighteen inches in height; is round, rough, hairy, and branched; with long, alternate, sessile, lanceolate, obtuse, hairy leaves. The flowers are of a reddish purple colour, and terminate the branches in close clusters. The calyx is persistent, divided into five oblong erect segments; the corolla funnel-shaped, consisting of a cylindrical tube the length of the calyx, and a five-toothed expansion, closed by five scaly leaflets. The filaments are shorter than the corolla, bearing simple anthers; the germens four, with filiform styles the length of the filaments, each crowned with an obtuse notched stigma.

Alkanet root is brought to this country chiefly from France. It is in twisted pieces, which have a withered dusky red, easily separated bark. The smaller roots are the best, as they have proportionally more bark than the larger.

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[1] Ab *αγχω strangulo, suffoco*; the ancients believing that this species of plants choked and destroyed serpents. Vide *Bod. in Theophrast.* p. 835.

Qualities. — It has a very faint odour, and a bitterish astringent taste when fresh; but the dried root is inodorous and insipid. It imparts a fine deep red colour to alcohol, ethers, oils, fats, and wax; but to water, even when hot, only a brown colour. Sulphate of iron strikes a black with the watery infusion; and sulphate of zinc throws down a copious dark-coloured precipitate.

Medical properties and uses. — Alkanet root was formerly prescribed as an astringent in several diseases; but it is properly rejected from modern practice, and is used as a colouring matter only for oils, ointments, and plasters.

ANETHUM.[1] *Spec. Plant. Willd.* i. 1469.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 560. *Fruit* nearly ovate, compressed, striated. *Pet.* involuted entire.

Species 1. A. *graveolens.* Common Dill. *Med. Bot. 2d ed.* 125. *t.* 48.

Species 3. A. *fœniculum.* Sweet Fennel. *Med. Bot. 2d ed.* 127. *t.* 49. *Smith Flor. Brit.* 329.

1. ANETHUM GRAVEOLENS.

Officinal. ANETHI SEMINA. *Lond.* Dill seed.

Syn. Fenouil puant, ou persil odorant (*F.*) Dill. (*G.*) Eneldo de olor pesado (*S.*) Appio palustre, sellano, Sellero (*I.*) Sadācoopay (*Tam.*) Sowa, (*Hind.*)

This plant is an annual, a native of Spain and Portugal, growing generally in corn-fields, and flowering in June and July, It is cultivated in this country.[2] The root is fusiform and long. striking deep into the ground; and sending up several erect grooved, jointed stems, about two feet in height, and branched. The leaves are glaucous and odorous, upon sheathing footstalks; doubly pinnated, with the pinnæ linear and pointed. The flowers are in large, flat, terminal umbels, without either universal or partial involucrum; the corolla consists of five ovate, obtuse, concave, yellow petals, with the apexes inflected: the filaments yellow, and longer than the corolla: with an inferior germen, covered by the nectary, and supporting two short styles, terminated by obtuse stigmas.

The seeds of dill, which are the parts of the plant medicinally used, are scarcely the length of a caraway seed, but broader and flatter; oval, concave on one side, convex and striated on the other, of a brown colour, and surrounded with a dull pale yellow or straw-coloured membranous expansion.

Qualities. — The dried seeds have an aromatic, sweetish odour, not very agreeable, nor yet unpleasant; the taste is moderately warm and pungent. These qualities depend on an essential oil, which is extracted by distillation with water, and imparted to alchohol by digestion. The bruised seeds yield their flavour to boiling water by infusion.

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[1] Ανηθον Dioscoridis.

[2] It was first cultivated by Gerarde in 1597.

Medical properties and uses. — Dill seeds are carminative and stomachic. They are scarcely ever employed except in hiccough and the flatulent colic of infants. The dose of the powdered seed is from grs. xv. to ʒj.

Officinal preparation. *Aqua Anethi.* L.

2. ANETHUM FŒNICULUM.

Officinal. FŒNICULI SEMINA. *Lond. Edin.* FŒNICULUM DULCE; SEMINA. *Dub.* The seed and root of Sweet Fennel.

Syn. Fenonil ou Anis douce (*F.*) Fenchelsamen (*G.*) Eneldo hinojo (*S.*) Finocchio (*I.*) Perumsiragam (*Taru.*) Mayuri (*Hind.*)

Fennel is a biennial plant, originally found in the south of Europe only, but now growing abundantly on our chalky soils and cliffs, and flowering in July and August. The root is fusiform, elevating a stem about four feet in height, erect, branching, leafy, striated, and smooth. The leaves are alternate, tripinnate, composed of long, smooth, depending, linear, leaflets, of a very deep green colour. The flowers are in large, terminal, many-rayed, flat umbels: the petals five, ovate, emarginate, with their points turned inward; and of a yellow colour: the filaments shorter than the petals, spreading, also yellow and bearing double anthers. The germen is similar to that of *dill*: the seed ovate, very little compressed, of a brownish olive colour when ripe, three-ribbed, and encircled with a membranous margin.

There are three varieties of fennel; the root of the first of which, the *common fennel*, and the seed of the second, the *sweet fennel*, are officinal. The roots found in the shops are the produce of our own country, and are taken up in the spring; but the seeds are generally imported from Italy.

Qualities. — The roots are covered with a brown bark, woody and white within, have scarcely any odour, and only a slightly sweetish taste, with very little aromatic warmth; but the *seeds* have a fragrant odour, and a sweet warm aromatic taste. These qualities depend on an essential oil, which is dissipated by decoction in water, and separated by distillation. They are completely imparted to alcohol, but only imperfectly to boiling water, by infusion. The seeds contain also a fixed, inodorous, insipid oil.

Medical uses and properties. — Fennel was formerly esteemed as a remedy; and supposed to be resolvent, diuretic, carminative, and stomachic; but even as a carminative it is not superior to anise seed and caraway; and it is therefore now seldom employed. The dose of the bruised seed may be from ℈j to ʒj.

Officinal preparations — *Aqua Fœniculi.* L. D. *Oleum Seminum Fœniculi dulcis.* D.

ANGELICA. *Spec. Plant. Willd.* i. 1428.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 343. *Fruit* roundish, angular, solid, with reflected styles. *Corollas* equal. *Petals* bent inward.

Species 1. Angelica *archangelica*, Garden Angelica. *Med. Bot.* 2*d ed.* 86, *t.* 35. *Smith Flor. Brit.* l. 311.

Officinal. ——, RADIX. *Edin.* The root of Angelica.

Syn. Angelique (*F.*) Angelikawurzel (*G.*) Angelica domestica (*I.*) Angelica (*G.*)

This species of angelica is a native of the more northern parts of Europe: but although it has been found growing wild in England, as at Broadmoore near Birmingham, and some other parts, yet it is uncertain whether it be indigenous. It is however abundantly cultivated for medicinal and other purposes; flowering in June and August.[1] The root is biennial, thick, fleshy, and resinous; the stem erect, hollow, round, smooth, furrowed, of a purplish hue, rising upwards of five feet in height, and sending off many branches, which terminate in globular many-rayed umbels, composed of dense, hemispherical umbellets. The leaves are numerous, petiolated, large, pinnated; with the leaflets ovate, pointed, cleft, and acutely serrated, smooth, somewhat decurrent, and the terminal ones three lobed: the petioles membranous at the base, nerved, greatly dilated, and bellying. The involucres are deciduous; the involucels short, consisting of five linear lanceolate leaves. The calyx is 5-cleft, minute: the corolla small, of a greenish white colour; petals 5, with the points turned inward: the stamens spreading, longer than the petals; and the germen inferior, supporting two reflected styles with obtuse stigmas. The seeds are large, elliptical, flat on one side, convex on the other, emarginate at both ends, and acutely three ribbed.

The roots of angelica, when wounded in the spring, yield an odorous yellow juice, which being slowly desiccated, proves an elegant gum-resin, very rich in the qualities of the plant. For medicinal purposes, the roots should be dug up in the autumn of the first year; in which case they are more easily preserved; but when gathered in the spring, they become mouldy, and are preyed on by insects. They should be thoroughly dried, and kept in a well-aired, dry place: and in order to secure their preservation, Lewis suggests "the dipping them in boiling spirit, or exposing them to steam, after they are dried." The leaves and seeds do not retain their virtues when kept. The stems are cut, when tender, in May, and made into an agreeable sweetmeat by the confectioners.[2]

Qualities.—The odour of every part of the recent plant is fragrant and aromatic; the taste sweetish at first, then aromatic, warm, and slightly bitter. The dried root is corrugated, and of a grayish brown colour externally; breaks short with a starchy fracture, and presents a firm interior, whitish with many resinous brown and yellow points. It has the same odour and taste as the recent plant; and yields these qualities to alcohol, and in some degree to boiling water.

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[1] It was first cultivated in England before 1568.

[2] The Icelanders eat the stems and roots of angelica raw with butter. Vide *Sir Geo. Mackenzie's Travels in Iceland*, 4to. p. 255.

Medical properties and uses. — The leaves and seeds when recent, and the root both in the fresh and dried state, are tonic and carminative; but although the most elegant aromatic of northern growth, yet, they are scarcely ever prescribed in modern practice. The dose in substance is from ʒſs to ʒj, three or four times a day.

ANISI SEMINA. Vide *Pimpinella Anisum.*

ANTHEMIS.[1] *Spec. Plant. Willd.* iii. 2174.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Discoideæ *Linn.* Corymbiferæ *Juss.*

G. 1517. *Receptacle* chaffy. *Seed down* none, or a membranaceous margin. *Calyx* hemispherical, nearly equal. *Florets* of the ray more than five.

* *With a colourless or white ray.*

Species 15. A. *nobilis.* Common Chamomile. *Med. Bot. 2d ed.* 47. *t.* 19. *Smith Flor. Brit.* 904.

—— 25. *Pyrethrum.* Pellitory of Spain. *Med. Bot. 2d. ed.* 50. *t.* 20.

1. ANTHEMIS NOBILIS.

Officinal. ANTHEMIDIS FLORES. *Lond. Edin.* CHAMÆMELUM; FLORES. *Dub.* Chamomile Flowers.

Syn. Camomille Romaine (*F.*) Roemische hamiller (*G.*) Camomilla Romana (*I.*) Manganella de Botera (*S.*) Chāmaindoopoo (*Tam.*) Baboenui (*A.*)

This species of anthemis is an indigenous perennial plant, growing in dry pastures, and flowering in August and September. The greater part of the chamomile, however, which is medicinally used, is cultivated by the growers of physical plants.[2] The roots are woody, fibrous and spreading: the stems trailing, about a span in length, foliaceous and downy: the leaves verticillately bipinnate, the pinnæ distant, and the leaflets small, threadlike, sharp, generally cleft into three segments; odorous, and of a pale green colour. The flowers are on solitary, terminal, unifloral, naked, striated hairy peduncles. The calyx is common to all the florets, hairy, with broad membranaceous edges: the disc is yellow and convex; the florets of the radius white, spreading, long, and somewhat elliptical, three-toothed, and turned down; and the seed obscurely crowned.

Both the single, and the double-flowered varieties are cultivated; but as the sensible qualities of the flower reside chiefly in the disc florets, the single kind is preferred: and as these qualities are also stronger before the tubular florets are blown, they are then picked, and carefully dried for use.

Qualities. — The whole of the plant is gratefully odorous.

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[1] Ανθεμις Dioscoridis.

[2] Much of what is brought to the London market is grown about Mitcham in Surry. The soil best adapted for it is a dry sandy loam. A wet summer weakens the flavour of the flowers. *Stevenson's Survey of Surry,* 379.

The smell of the flowers is strong and fragrant; their taste bitter and aromatic, with a slight degree of warmth; and both the odour and the taste are extracted by water and alcohol. By distillation with water, they yield a small quantity of brownish yellow essential oil, on which the odour and the antispasmodic powers of the plant seem to depend. Hot water takes up nearly one-fourth of the weight of the dry flowers, and when the infusion is evaporated, a bitter extractive matter and a small portion of resin remain. The active principles, therefore, of chamomile flowers appear to be bitter extractive, resin, and essential oil.

Medical properties and uses. — Chamomile flowers are tonic, carminative, and slightly anodyne: yet when a strong infusion of them is taken in a tepid state, it proves powerfully emetic. Given in substance, united with opium and astringents if the bowels be easily affected, they have been successfully used for the cure of intermittents: and the infusion, in combination with ginger, or other aromatics, and the alkalies, is an excellent stomachic in dyspepsia, chlorosis, gout, flatulent colic, and chronic debility of the intestinal canal. The tepid strong infusion is a ready emetic, and is often employed to promote the operation of other emetics. By coction in water the essential oil is dissipated; chamomile flowers, therefore, ought never to be ordered in decoctions. Externally they are used as fomentations in colic, intestinal inflammation, and to phagedenic ulcers: and their infusion is also found to be an useful addition to emollient anodyne glysters in flatulent colic, and irritations of the rectum producing tenesmus. The dose of the powdered flowers is from ʒſs to ʒij, twice or thrice a day.

Offi. preparations. *Decoctum Anthemidis nobilis.* E. D. *Infusum Anthemidis* L. *Extractum Anthemidis* L. E. *Oleum Anthemidis* L.

2. ANTHEMIS PYRETHRUM.[1]

Officinal. PYRETHRI RADIX. *Lond. Edin.* PYRETHRUM; RADIX. *Dub.* Pellitory root

Syn. Pyrèthre (*F.*) Bertram Wurtzel; Zahn wurtzell (*G.*) Piretro (*I.*) Anthemis pelitri (*S.*) Akkārācārum (*Tam*) Akurkurha (*A.*)

This is a perennial plant, a native of the Levant, Barbary, and the south of Europe. It is sometimes cultivated in Britain,[2] flowering from June to July. The root is long, tapering, about the thickness of a finger, with a brownish cuticle, sending off several lateral fibres; and throwing up many trailing stems, more commonly simple and unifloral than branching. The leaves are doubly pinnate, with narrow linear segments of a pale green colour. The flowers are large, with the florets of the radius white on the upper, and purple on the under side, and those of the disc yellow. In form they resemble the flowers of Anthemis *nobilis.*

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[1] Πυρεθρον Dioscoridis.

[2] It was cultivated in England by Lobel in 1570.

Pellitory root is brought into this country from the Levant, and the coast of Barbary, packed in bales. It is frequently mixed with other roots, from which, however, it is easily distinguished.

Qualities.—The dried root, as we receive it, is inodorous. When chewed it appears at first insipid, but after a few seconds, excites a glowing heat, and a pricking or thrilling sensation on the tongue and lips, which remains for ten or twelve minutes. The pieces break with a short resinous fracture; the transverse section presenting a thick brown bark studded with black shining points, and a pale yellow radiated inside. The pungency appears to depend on a resinous matter, as it is completely extracted by alcohol and sulphuric ether.

Medical properties and uses.—Pellitory root possesses powerful stimulant properties. Its chief use is as a sialagogue, to releave and to stimulate the excretories of the salivary glands, and excite an increased flow of saliva; by which inflammations and congestions of the neighbouring parts are releaved. Hence it has been found useful when chewed in some kinds of headach, apoplexy, chronic opthalmia, rheumatic affections of the face, and toothach; and by its direct stimulus in paralysis of the tongue and muscles of the throat.

ANTIMO'NIUM. *Στιμμι.* *Stibium.* Antimony.

Syn. Antimoine (*F.*) Spiessglanzmetall (*G.*) Antimonie (*I.*) Antimónio (*S.*)

The term antimony was formerly given to an ore, in which antimony was combined with sulphur; but it is now solely appropriated to express the pure metal. It is found in various parts of the world in different states of combination.

A. Metallic. (at Stalberg, Sweden, and Allemont in France.)	
i. combined with arsenic.	Sp. 1. *Native antimony.*
ii. ——— with sulphur.	2. *Gray sulphuret of antimony.* Var. *a.* compact. *b.* foliated. *c.* striated. *d.* plumose.
	3. *Red antimony.*
B. Oxidized. iii. combined with oxide of iron.	4. *White antimony.* 5. *Antimonial ochre.*
C. Acidified. iv. combined with either phosphoric or muriatic acid.	6. *Yellow antimony.*

The grey sulphuret is the ore in which it is most abundantly procured, and from which the pure metal is generally obtained. Pure antimony is of a white colour with a blueish shade, brilliant, and very slowly tarnished in air of a low temperature. The texture is foliated; moderately hard; brittle and pulverulent. It is fusible at 809°: in a higher temperature it volatilizes in close vessels; but, if exposed to the air, is very rapidly oxidized. It decomposes water when ignited, and is oxidized by, and combines with, the sulphuric, nitric, and muriatic acids; but the other acids unite with its oxides only. It readily combines with sulphur and phosphorus. Its specific gravity, according to Brisson, is 6.702. The pure metal exerts no action on the body, nor is it used for officinal purposes.

Officinal. **ANTIMONII SULPHURETUM.** *Lond.* **SULPHURETUM ANTIMONII.** *Edin. Dub.* Sulphuret of Antimony.

Syn. L'Antimoine sulfure (*F.*) Spiessglanz (*G.*) Sulfuro d'Antimonio (*I.*) Kohul (*Arab.*) Surmeh (*H.*) Saubira (*San.*)

Sulphuret of antimony is commonly sold in loaves, and is the *gray ore*, separated from the stony matter and other gross impurities with which it is naturally combined. It is the *striated variety*, the most common of all the antimonial ores, found both in masses and crystallized in Hungary, Saxony, France, Tuscany, Spain, and Cornwall in England; generally "in micaceous schistus and clay porphyry, mixed with pyrites and oxides of iron." It is fitted for the market by the following process. The ore is separated from the greater part of the stony gangue by hand, and then placed in the bed of a reverberatory furnace, covered with charcoal powder. As it is brought to a low red heat, the sulphuret of antimony is fused, while the earthy parts float on the surface, and are taken off with a rake or ladle: and the fluid portion, cast into the form of loaves or large cakes, is fit for sale, and forms the *crude antimony* of commerce.[1] These loaves are dark-gray externally, but internally they have a striated structure, and considerable brilliancy. Their goodness depends on their compactness and weight, the largeness and distinctness of the striæ, and the volatility of the sulphuret. When they contain much lead, the structure is more foliated, and the volatility diminished; arsenic is discovered by the garlic odour emitted when the sulphuret is thrown on live coals; and manganese and iron, by their not being volatilized when it is exposed to a red heat. The specific gravity of the sulphuret is about 4.368; and its constituents are antimony 100, sulphur 35.572.[2] The greater part of the sulphuret used in this country is imported from Germany and Holland.

Qualities.—Sulphuret of antimony is inodorous, insipid, of a leaden gray or steel colour, staining the fingers; has a rough spicular fracture, and is insoluble in water. Its brilliancy is dulled by long exposure to the air; in a red heat it melts, and is partly dissipated along with its sulphur in the form of a white smoke; and what remains in the crucible is a gray ash-coloured oxide. It decomposes the sulphuric and nitric acids when assisted with heat; the metallic part of the sulphuret is oxidized, and sulphureous acid and nitrous gases are disengaged: the muriatic, even in the cold, decomposes it, and sulphureted hydrogen is extricated. The fixed alkalies combine with it, and form compounds used in medicine.[1]

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[1] *Journal des Mines—Aikin's Dictionary of Chemistry.*

[2] I have adopted Dr. Thomson's proportions, because they are nearly a mean of all the other analyses that have been published: Vauquelin stated them to be, antimony 100, sulphur 33.333; Dr. J. Davy, antimony 100, sulphur 34.960; and Berzelius, antimony 100, sulphur 37.000.

Medical properties and uses.—Sulphuret of antimony is not an active medicine when taken into the stomach, unless it meets with acid in that viscus and the bowels. It was not employed internally until the middle of the fifteenth century; and now, owing to the uncertainty of its operation, and the difficulty of obtaining it perfectly free from other noxious metals, as copper, lead, and arsenic, it is almost entirely discarded from modern practice. It has been given in gouty and rheumatic affections, scrofula, and in chronic cutaneous eruptions.

It produces perspiration; and in a few instances in which it was given in large doses, Dr. Cullen found that some nausea, and even vomiting, were excited. Its chief use is for the preparation of the other antimonial remedies.

The dose of the sulphuret may be from ten grains to two drachms, or more if the stomach can bear it.

Officinal preparations. The table drawn up by Dr. Black has generally been given as presenting the best view of the officinal preparations of which antimony is the basis; but as many of those mentioned in it have been long since disused, and the nomenclature of all is changed, we have altered it so as to present, on the same plan, a distinct view of the preparations now found in the British Pharmacopæias.

Medicines are prepared from SULPHURET of ANTIMONY,

I. By trituration in the metallic state united with sulphur.
  1. *Sulphuretum Antimonii præparatum.* E. D.

II. By the action of heat with phosphate of lime; (*oxidized.*)
  2. *Oxidum Antimonii cum Phosphate Calcis.* E. *Pulvis antimonialis.* L. D.

III. By the action of alkalies; (*oxidized.*)
  3. *Antimonii Sulphuretum præcipitatum.* L. E. *Sulphur antimoniatum fuscum.* D.

IV. By the action of acids; (*oxidized.*)
  4. *Antimonii Oxydum.* L. *Oxydum Antimonii nitro-muriaticum.* D.
  5. *Antimonium tartarizatum.* L. *Tartris Antimonii,* olim *Tartarus emeticus.* E. *Tartarum antimoniatum,* sive *emeticum.* D.
  6. *Liquor Antimonii tartarizati.* L. *Vinum Tartritis Antimonii.* E.

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[1] The sulphuret is used by the Turkish ladies for staining the eyelashes black, which softens the appearance of the eye; a custom of very ancient origin.

All these preparations of antimony have one general mode of action, and possess, therefore, the same medicinal virtues. Their general operation is evacuant, either by the stomach, the bowels, or the skin; but their determination to these particular parts depends more on the dose, and the constitution and state of the patient, than on the nature of the preparation. In small doses they produce nausea, and diaphoresis; in larger doses, vomiting and purging.

Antimonials are principally employed for the cure of febrile and inflammatory diseases, when the excitement is great; but in the latter stage of fever, when much debility prevails, their use is contraindicated. Some have imagined that the preparation which produces the least sensible evacuation, the antimonial powder of the London College, or its prototype James's powder, is to be preferred in typhus, and the tartarized antimony in synochus; believing that the benefit in the first disease is greater when no sensible evacuation is produced: but as this implies some inexplicable specific action of that preparation, we are not inclined to admit the distinction.

ARBUTUS. *Spec. Plant. Willd.* ii. 616.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Bicornes *Linn.* Ericæ *Juss.*

G. 871. *Cal.* five-parted. *Corolla* ovate, the mouth pellucid at the base. *Berry* five-celled.

Species 7. A. *Uva Ursi.* Trailing Arbutus or Bearberry. *Med. Bot. 2d edit.* 287. *t.* 100. *Smith's Flora Britan.* i. 403.

Officinal. UVÆ URSI FOLIA. *Lond. Dub.* ARBUTI UVÆ URSI FOLIA. *Edin.* Leaves of Uva Ursi, Bearberry, or trailing Arbutus.

Syn. Bousserole; Raisin d'ours (*F.*) Baerentraube; Sandberren (*G.*) Uva Orsina (*I.*) Madronna Uva de Oso; Guaynha (*S.*)

This shrub is a native of the north of Europe, and is found growing wild on the heathy mountains of Scotland, flowering in June. It is a low shrub, with the branches nearly trailing; woody, and the bark smooth. The leaves are not unlike those of the myrtle, thick, evergreen, alternate, obovate, or wedge-shaped, on short petioles; with a net-work of veins on the under surface, which is pale green, whilst the upper is of a very deep green colour, and glossy. The flowers are in small clusters, each supported on a red pedicel. The calyx is small, and obtusely five-toothed; the corolla tubular, oval, flesh-coloured, or whitish with a red lip, divided at the margin into five minute, obtuse reflex segments; containing ten short, downy filaments crowned with erect reddish anthers; and an oval germen, bearing a style longer than the anthers, with a simple stigma. The fruit is a small, round, smooth, glossy, red berry, with a depressed umbilicus, five-celled, of an austere taste, and containing five angular seeds.

The plant should be procured in autumn; and "the *green* leaves alone selected and picked from the twigs, and dried by a moderate exposure to heat."[1]

Qualities.— The fresh leaves are inodorous, and have a slightly bitter astringent taste, leaving a sweet sensation in the mouth. When properly dried and powdered they acquire an odour similar to that of hyson tea; but the taste remains the same, the degree of bitterness only being increased. The colour of the powder is a light brown, with a shade of greenish yellow. Both water and alcohol extract its virtues, and the watery infusion strikes a deep black colour with sulphate of iron. According to the analysis of Melandri and Moretti, the leaves yield tannin, mucus, bitter extractive, gallic acid, some resin, lime, and its oxygenizable extract.

Medical properties and uses. — Uva ursi possesses astringent properties,[2] on which account it was employed by the ancients in several diseases; but it was not till after the middle of the last century that the attention of modern practitioners was directed to it, as a remedy for calculous complaints, and ulcerations of the urinary organs, by De Haen. His observations were confirmed by Cullen; who, however, referred the good effects it produced to its action on the stomach. It has also been employed in menorrhagia, cystirrhœa, diabetes and other fluxes; and Dr. Bourne has lately recommended it in phthisis pulmonalis. He combined it with cinchona and opium, but the cases he published were scarcely sufficiently decisive to confirm its use in this complaint. The dose of the powdered leaves is from ℈j to ʒj two or three times a day.

ARCTIUM[3]. *Spec. Plant. Willd.* iii. 1630.

Cl. 19. *Ord.* 1. Syngenesia Æqualis. *Nat. ord.* Compositæ Capitatæ *Linn.* Cinarocephalæ *Juss.*

G. 1429. *Receptacle* chaffy. *Calyx* globular; the scales at the apex with inverted hooks. *Seed-down* bristly-chaffy.

Spec. 1. Arctium *Lappa.* Common Burdock. *Med. Bot. 2d edit.* 32. *t.* 13. *Eng. Bot.* 1228. *Smith's Flora Britan.* ii. 844.

Officinal. — ARCTII LAPPÆ SEMINA ET RADIX. *Edin.* BARDANA; RADIX. *Dub.* The root of Burdock.

Syn. Bardane (*F.*) Bardana (*I*) Bardána (*S.*)

This is an indigenous biennial plant, common on the sides of roads and in waste places; flowering in July and August. It is so well known as scarcely to require a description. The root is spindle-shaped, simple, externally of a brown colour, and internally white; the stem succulent, rising three or four feet in height, with spreading branches; and very large, undulated, cordate leaves, of a dark green colour above, and whitish underneath, supported on long footstalks. The flowers are in terminal panicles; the calyx is common, globular, composed of imbricated scales, with hooked extremities, by which they adhere to clothes, and the fur of animals; the corolla is compound, with purple uniform florets, tubular, five-cleft, and all fertile. The receptable is punctured; has many rough prickly seed downs, and quadrangular seed.

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[1] *Cases of Pulmonary Consumption, &c. healed with Uva Ursi, by Robert Bourne, M. D.*, 8vo., *Lond.* 1806.

[2] It is used in Russia for tanning leather.

[3] Αρκτιον Dioscoridis.

Qualities. — The roots of burdock are inodorous, the taste sweetish, with a slight degree of bitterness and astringency. The seeds, which are sometimes used, are aromatic, bitterish, and subacrid.

Medical properties and uses. — The seeds and roots of this plant possess some diuretic powers, and are said to determine also to the surface, without exciting nausea, or increasing irritation. They have been employed, and, as far as report can be credited, with advantage, in scurvy, arthritic affections, lues venerea, phthisis, and nephritic complaints. We have no experience of their efficacy; but are ready to believe that the remedy is at least safe. A decoction, made by boiling two ounces of the fresh root in three pints of water to two, should be taken, in divided doses, in twenty-four hours.

ARGENTUM. *Lond. Edin.* ARGENTUM; IN LAMINAS EXTENSUM. *Dub.* Silver. Silver Leaf.

Syn. Argent (*F.*) Silber (*G.*) Argento (*I.*) Pláta (*S.*) Villie (*Tam.*) Rupáh (*H.*) Fizzeh (*A.*)

Silver exists native, and mineralized, in different parts of the globe, but not in any very great abundance. It is found

A. In its metallic state;	
a. pure, crystallized.	Sp. 1. *Native silver.*
b. alloyed with gold.	2. *Auriferous silver ore.*
c. ——— with mercury.	3. *Native amalgam.*
d. ——— with antimony.	4. *Antimonial silver.*
e. ——— with iron and arsenic	5. *Arsenical silver.*
B. Sulphurets;	
f. combined with sulphur.	6. *Sulphuret of silver.*
g. ——— with lead, antimony, and iron.	7. *White silver ore.*
C. Oxidized;	
h. ——— with antimonial sulphuret of silver.	8. *Red silver ore.* Subsp. *a.* dark red. *b.* light red.
D. Salts;	
i. ——— with muriatic acid.	9. *Horn silver, common and earthy.* 10. *Sooty silver ore.*
k. ——— with carbonate of antimony.	11. *Carbonate of silver.*

Besides these ores, there are many metallic ores which contain silver in sufficient quantity to render the extraction of it profitable. It is obtained in its pure metallic state either by fusion or by amalgamation. By the first process the ore is roasted to expel the sulphur, antimony, arsenic, or other volatile principles; the residuum is then fused with lead, and exposed in a cupel, (a vessel made of bone or of wood ashes,) to a strong heat in the hearth of a refining furnace: when the lead and the foreign metals being thus oxidized, are in part absorbed by the porous cupel, and in part volatilized and driven off by the current of air from the bellows or the blast pipe. An experienced eye knows when the silver is sufficiently pure; but in general it requires a second cupellation at a higher temperature to purify it completely from the lead with which it is combined. By the second process, the ore is first roasted, then ground to a fine powder, washed, and formed into an amalgam with mercury, by being mixed in small barrels made to revolve very rapidly on their axes by means of machinery. The silver is then separated from the mercury by distillation.

Qualities.—Pure silver is a brilliant white, insipid, inodorous, sonorous metal, with a very rich lustre, which it loses when long exposed to the air, owing to sulphureted hydrogen being almost always present in the atmosphere. It is in hardness between iron and gold, of considerable malleability, the finest silver leaf being only one-third thicker than gold leaf. It is of inferior ductility to gold, platina, and iron. Its specific gravity is 10.47. Silver is fusible at 28° Wedgwood; volatilized by a stronger heat; but difficult of oxidizement by the action of heat and air. It is oxidized by several of the acids, and combines with them; but none of the compounds, except that produced with the nitric acid, are used in medicine.

Medical properties and uses.—Metallic silver has no action on the human body; but when combined with nitric acid, it forms a very powerful remedy. Many of the instruments used by the surgeon require to be made of silver.

Officinal preparation. *Argenti Nitras.* L. E. D.

ARISTOLOCHIA[1]. *Spec. Plant. Willd.* iv. 151.

Cl. 20. *Ord.* 4. Gynandria Hexandria. *Nat. ord.* Sarmentaceæ *Linn.* Aristolochiæ *Juss.*

G. 1609. *Cor.* of 1 petal, strap-shaped, ventricose at the base. *Cap.* 6-celled, inferior, containing many seeds. *Stem* twining, frutescent.

Spec. 27. A. *serpentaria.* Virginia Snakeroot, or Birthwort. *Med. Bot. 2d edit.* 152. *t.* 59.

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[1] Αριστολοχια Dioscoridis gives name to the genus, but is not the officinal plant, which was introduced only since the settlement of Europeans in America.

Officinal. — SERPENTARIÆ RADIX. *Lond.* —— RADIX. *Edin.* SERPENTARIA VIRGINIANA; RADIX. *Dub.* Serpentaria Root.

Syn. Serpentaire (*F.*) Virginische Schlangenwutzel (*G.*)

This plant is a native of North America, from Pennsylvania to Florida, and flowers in August. The root is perennial, consisting of bundles of fibres attached to a contorted horizontal trunk, from which several stems rise about ten inches in height, slender, crooked, and jointed; supporting on long footstalks at each knot, thin, cordate, entire, pointed, trinerved leaves, of a yellowish green colour. The flowers proceed from the joints near the root, and stand upon long sheathed articulated peduncles: there is no calyx; the corolla is of a brownish purple colour, globular at the base, contracted and bent in the middle, and terminating in a triangular lip. The anthers are sessile, attached to the under side of the stigma, which is roundish, divided into six parts and almost sessile, rising from an oblong, angular, hairy, inferior germen. The seeds are flat, and contained in a six-celled, hexagonal capsule.

Dried serpentaria root is imported into this country in bales, each containing from two to five hundred weight.

Qualities.—The dried root has an aromatic odour, not unlike that of valerian; and a sharp, warm, bitter taste, resembling in some degree that of camphor. Water extracts all the sensible qualities of the root, affording a yellowish brown infusion which is not altered by sulphate of iron or zinc, nitrate of silver, oxymuriate of mercury, tartarized antimony, the mineral acids, and the alkalies; nor is it precipitated by gelatine or tannin. The superacetate of lead throws down a floculent precipitate, which is not soluble in acetic acid, showing the presence of mucus. With alcohol it affords a bright greenish tincture, which is rendered turbid by the addition of water. The active principles of serpentaria, therefore, appear to reside in a bitter resin; and an essential oil.

Medical properties and uses. — Serpentaria root is a stimulating diaphoretic and tonic. It is beneficially employed in typhoid and putrid fevers, whether idiopathic, or accompanying the exanthemata, to excite diaphoresis, and support the powers of the system; and is found frequently to increase the efficacy of cinchona in removing protracted intermittents. It is also an excellent remedy in dyspepsia, particularly when the skin is dry and parched; and is sometimes used as a gargle in putrid sore throat. On acount of its stimulant properties, it is contraindicated in the inflammatory diathesis; and previous to its exhibition the bowels should be well evacuated.

It may be given in substance, or in infusion made by macerating ʒiv of the bruised root in f℥xij of boiling water, in a covered vessel for two hours, and straining. Decoction is a bad form of giving serpentaria, as the boiling dissipates the essential oil, on which the virtues of the remedy chiefly depend. The dose of the powdered root is grs. x. or grs. xx. increased to ʒſs; that of the infusion f℥jss to f℥ij. every fourth hour.

Officinal preparations. *Tinctura Serpentariæ.* L E. D. *Tinctura Cinchonæ composita.* L. D. *Electuarium opiatum* E.

ARMORACIÆ RADIX. Vide *Cochlearia Armoracia.*

ARNICA. *Spec. Plant. Willd.* iii. 2106.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Discoideæ *Linn.* Corymbiferæ *Juss.*

G. 1491. *Recep.* naked. *Seed-down* simple. *Cal.* with equal leaflets. *Corol.* of the ray have more frequently five filaments without anthers.

Spec. 1. A. *montana.* Mountain Arnica. *Med. Bot. 2d ed.* 41. *t.* 17. *Flor. Dan. t.* 728.

Officinal. ARNICÆ MONTANÆ FLORESET. RADIX. *Edin.* ARNICA; FLORES, RADIX. *Dub.* The flowers and root of Arnica.

Syn. Arnique (*F.*) Arnika, Woheverleih (*G.*) Arnica (*I.*)

This species of Arnica is a native of the northern parts of the continent of Europe, and of Siberia; flowering in July. It is cultivated in our gardens.[1] The root is perennial, woody, præmorse, with bundles of long fibres attached to it: the stem which rises about a foot in height, is obscurely angular, striated, rough, hairy, and terminated by two or three upright peduncles, each bearing one flower. The radical leaves are ovate, entire, and more obtuse than those of the stem, which are in opposite pairs and lance-shaped. The flowers are of a deep yellow colour tinged with brown; the calyx is a dirty green, composed of fifteen or sixteen lancet-shaped hairy scales with purple points: the ray consists of about fourteen ligulate flowers twice as long as the calyx, striated, three-toothed, and hairy at the base. The seeds are oblong, striated, hairy, and crowned with a russet-coloured down.

The herbaceous part of the dried herb, which is used equally with flowers and root, seems as if covered with a hoary powder.

Qualities. — The dried plant has a pleasant, weak, aromatic odour, and excites sneezing. The taste of the *leaves* and *flowers* is slightly aromatic, bitter, and pungent; that of the root bitter and acrid. The leaves and flowers macerated in boiling water, yield an olive brown infusion, which has an odour not unlike that of senna, and a bitter, hot taste. It reddens tincture of litmus; but does not precipitate glue, nor alter solutions of tartarized antimony, and of oxymuriatic of mercury. With sulphate of iron and of zinc it strikes a deep green colour, and gives dark precipitates. Superacetate of lead coagulates it. The mineral acids render it muddy, and of a dirty white colour, occasioning brown precipitates; but the alkalies only deepen its proper colour. Both alcohol and sulphuric ether take up from the flowers and leaves a resinous matter, which can be separated from the alcohol by water, and from the ether by evaporation. Hence we may conclude that arnica contains a peculiar acid,[1] a bitter resinous matter, and mucus; and that sulphates of iron and of zinc, superacetate of lead, and the mineral acids, are incompatible in prescriptions with infusions of its leaves and flowers.

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[1] It was introduced by Mr. P. Miller in 1759.

Medical properties and uses.—The *leaves* and *flowers* of arnica are narcotic, stimulant, and diaphoretic; and in large doses, emetic and cathartic: the *root* is tonic and aromatic. The former have been used with advantage in paralytic affections, amaurosis, gout, rheumatism, and chlorosis. They have been extolled also in convulsive diseases, diarrhœa, and dysentery; but in the latter their stimulant properties prove often hurtful. In paralysis their good effects are generally preceded by a pricking sensation in the affected part; but in general they do not produce any sensible operation, unless when exhibited in too large doses: in which case they produce great anxiety, pain, vomiting, and the other deleterious effects of powerful narcotics. The *root* has been much extolled in Germany, as a succedaneum for cinchona in intermittents, putrid fevers, and gangrene; particularly by Dr. Collin of Pazman; but in the hands of British practitioners it has not deserved the high encomiums he has bestowed on it in these cases. It is regarded by the French practitioners as an excellent tonic in paralysis.[2]

Externally the powdered leaves may be used as an errhine.

Arnica may be exhibited in substance; or in an infusion, made by macerating ʒjſs of the leaves and flowers, or ℈ij of the bruised root, in fʒxiij of boiling water, and straining through linen. The infusion soon ferments. A dose of the powder is from grs. v. to grs. x.; that of the infusion fʒjſs twice or thrice a day.

ARSENICUM[3], Arsenic.

Syn. Arsenic (*F.*) Arsenick (*G.*) Arsenico (*I.*) Arsénico (*S.*)

This metal is found in most parts of the world, accompanying other metals; and occasionally uncombined forming distinct and peculiar veins. The following are the states in which arsenic is found:—

A. In its metallic state:

i. Alloyed with iron,
silver, gold, cobalt. *Sp.* 1. *Native arsenic.*

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[1] Bouillon la Grange thinks it is the Gallic acid.

[2] Vide, *Nouveaux Elemens de Therapeutique*, par I. L. Alibert, 2d. ed. vol. i. p. 141.

[3] From αρσενικον Dioscoridis, which, however, is not the metal, but one of the species of the sulphuret, realgar; σανδαραχη of the other Greeks.

B. United with sulphur:	
ii. sulphuretted	2. *Arsenical pyrites.*
	3. *Orpiment.* Var. *a* Realgar.
	b. Yellow orpiment.
C. United with oxygen:	
iii. oxidized.	4. *Native white oxide.*
D. Acidified:	
iv. Combined with lime	5. *Arseniate of lime. Pharmacolite*
v. ———— with copper.	6 *Arseniate of copper.*
	Var. *a* Foliated.
	b Lenticular. *c* Oliven ore.
vi ———— with iron.	7. *Arseniate of iron. Cube ore.*
vii. ———— with lead	8. *Arseniate of lead.*
viii ———— with cobalt.	9. *Arseniate of cobalt. Red cobalt ore.*
	Var. *a.* Cobalt crust.
	b. Cobalt bloom.

As metallic arsenic is not used in the arts; it is not extracted from its ores; but is prepared for the purposes of experiment or of curiosity from the white oxide, which is commonly procured in roasting the arseniate of cobalt. It is necessary, however, to be acquainted with the appearances and properties of metallic arsenic, as one mode of ascertaining whether the white oxide has been used as a poison, in cases of suspected death, is by reducing the oxide.

Its colour is blueish gray, something like that of steel, with much brilliancy. It is quickly tarnished by exposure to the air, becomes black, and falls into powder. It is extemely brittle, and pulverulent. Its specific gravity is 8.310. It volatilizes at ~~a heat~~ of 356° Fahrenheit in dense white fumes, which have the odour of garlic, although the solid metal is inodorous. In its metallic state arsenic exerts no action on the animal system; but when oxidized it is a virulent poison.

Officinal. ARSENICI OXYDUM. *Lond.* OXIDUM ARSENICI *Edin.* ARCENICUM; (*Oxydum album*) *Dub.* Oxide of Arsenic.

Syn. Arsenic oxydé natif (*F.*) Naturlicher Arsenickhalk (*G.*) Arsenico iixneo (*I.*) Arsenico herabulhalik (*Arab*) Samuel-k'har (*H*) Sanc'hya (*San*)

The greater part of the white oxide of arsenic of commerce is obtained in Bohemia and Saxony, in roasting the cobalt ores, and sometimes by sublimation from arsenical pyrites. The roasting is performed in furnaces with long flues, in which the impure oxide is condensed: and this is purified by sublimation in the following method. Large square boxes of cast iron, furnished with conical heads, which are closely luted to them with clay, are disposed in a brick area heated by the flues of two furnaces placed a little beneath them. When these boxes are red hot, the impure arsenic, by fifteen pounds at a time, is put into them, where it melts, and soon sublimes in the conical head. Successive additions are thus submitted to the action of heat, till about 150 pounds have been used to each vessel; and then the apparatus is allowed to cool. The conical head is now separated from the box, and carried with its contents into another place, where the workmen break off with hammers the sublimed oxide, separating the impurities for a second operation.[1]

The oxide or *arsenous acid*, thus obtained is a dense, semi-transparent, solid cake; which becomes opaque, of a snowy whiteness, and pulverulent, when exposed to the air. It is met with in both these forms in the shops; and often is sold in powder, in which state it is sometimes adulterated with white sand, chalk, and gypsum: but the fraud is easily detected by heating a small portion of the suspected powder; by which the oxide is entirely dissipated, and the impurities left behind.

The greater quantity of the oxide of arsenic used in this country is brought from Germany, in casks, each containing from two to five hundred weight.

Qualities. — White oxide of arsenic is inodorous; has an acrid taste, leaving on the tongue a sweetish impression; and is highly corrosive.[2] When pure, if it has not been freely exposed to the action of the air, it is in transparent, colourless, shining masses, which resemble glass, and break with a conchoidal fracture. It is soluble in 400 parts of water at 60°, and in 13 parts of boiling water; and the latter solution, on cooling, retains 3 parts of the white oxide for every 100 of water, and deposits the remainder in tetrahedrous crystals.[3] Both solutions redden infusion of litmus, and combine with the alkalies. It is soluble also in alcohol and oils. When heated in the open air, this oxide is volatilized in a temperature of about 383° Fahr., and the vapour has no odour. The specific gravity of the oxide in its ordinary state is 3.706, that of the glass 3.699. According to the average of the experiments by different chemists, 100 parts of the oxide consist of between 74 and 75 of arsenic, and 34 and 35 of oxygen.[4] On the simple watery solution of the oxide no change is produced by a solution of sulphate of iron, of oxymuriate of mercury, tartarized antimony, the mineral acids, or the alkalies: but nitrate of silver throws down a yellowish precipitate, which gradually passes to a brown colour; and a white precipitate is produced by superacetate of lead. Lime water also precipitates it white; sulphurets of the alkalies, pale yellow; and sulphuretted hydrogen gas, golden yellow.

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[1] *Journal de Physique*, tom. i. p. 44.

[2] With Fourcroy the majority of Chemists now regard it as an acid.

[3] Klaproth, *Schweigger's Journal*, vol. vi. p. 232; and *London Med. Repository*, vol. ii. p. 250.

[4] Dr. Thomson's proportions are, arsenic 100 + 34.930 oxygen. *Annals of Phil.* iv. p. 176.

Medical properties and uses.—Although white oxide of arsenic is the most virulent of the mineral poisons, yet, when properly administered, it is a medicine of great efficacy; and is employed internally as a tonic, and externally as an escharotic. It had been long used as an internal empirical remedy in cancer, and some cutaneous affections, both in Europe and the East Indies; and for the cure of intermittents in Hungary; and in Lincolnshire under the name of "the ague drop:" but its effects were not clearly understood, nor the proper mode of administering it known, till Dr. Fowler of Stafford published his Observations on its use in the cure of remitting fevers and periodic head-achs. Since that time the authority of many respectable practitioners has been brought forward in confirmation of its efficacy in these diseases; and in lepra, chronic rheumatism, intermittent hemicrania or *megrim*, scirrhus: and some local painful affections "of the ends of the bones, cartilages, or ligaments, or of all three together." It has also been used in dropsy, hydrophobia, syphilis, visceral and glandular obstructions, and in many other diseases, in which, however, its efficacy is by no means established.[1] In the East Indies the native physicians employ arsenic (*sanc'hya*) made into pills with six parts of black pepper, for the cure of confirmed lues (*Persian fire*), and a species of elephantiasis (*Judham*).[2]

The internal use of white oxide of arsenic is contraindicated in all cases attended with strong arterial action; and where there are any pulmonary symptoms: and should a cough even intervene during its use, it should be instantly discontinued. When it is exhibited in proper cases, and with necessary precaution, the effects it produces must be carefully observed: "the feeling of swelling and stiffness of the palpebræ and face, heat, soreness and itching of the tarsi, or tenderness of the mouth[3]," are indications that the dose of the remedy has been carried to its full extent, and should then be diminished. If erythema or salivation appear, the use of it must be suspended: and it should be altogether abandoned if pain of the stomach, nausea, vomiting, head-ach, vertigo, or cough be induced.

The white oxide is exhibited either in substance or in solution. The best mode of giving it in substance is in the form of pills, formed by rubbing one grain of the oxide with ten grains of sugar, and then beating the mixture with a sufficient quantity of crumb of bread, so as to form ten moderately-sized pills; one of which is a dose. The solution, however, is more manageable. The most common form of it is that of the London College; (vide *Liquor arsenicalis*,) but the simple solution in distilled water, in the proportion of four grains to a pint, is also given according to M. Le Febvre's method. A table spoonful of the solution, mixed with a little syrup of poppies and half a pint of milk, is directed to be taken in a morning fasting, and the frequency of the dose increased until six spoonsful be daily taken.

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[1] For a list of these diseases, see a paper by Mr. Hill of Chester. *Edinburgh Med. Journ.* v. 19, 312, and vi. 55.

[2] Asiatick Researches, 8vo. 5th edit. vol. ii. p. 153.

[3] Dr. Kellie, *ib*

As an external application the oxide of arsenic has been long employed in cases of cancer; and has certainly done more to improve the ulceration, and give it a disposition to contract and heal, than any other external application. It has been sprinkled, in the form of powder, upon the sores; but the most violent pain follows this mode of applying it; and in some instances, probaby from its absorption, the general system has been dangerously affected. The more usual mode of using it is in the form of a lotion, composed of eight grains of the oxide, and the same quantity of subcarbonate of potass, dissolved in four fluid ounces of water; or as an ointment, formed by rubbing together one drachm of the oxide and twelve drachms of spermaceti ointment. These applications produce little pain and irritation, cause the diseased parts to slough off, and amend the fetid discharge; but, although, to a certain extent they produce the most beneficial effects, yet, the instances in which a cure has been effected are very rare.

The white oxide of arsenic is not unfrequently the cause of death; arising from accidents occurring to those artists who use it in their manipulations; as glass-makers, dyers, and workers in gold: or from ignorance of the proper dose of its preparations when medicinally used; or from the employment of it as a poison. The symptoms which occur are those of inflammation of the stomach, incessant vomiting, purging, and pain of the stomach[1]; constriction of the throat, and great heat of the mouth; sinking of the pulse, cold sweats, convulsions, and death: but if the quantity be not sufficient to produce speedy dissolution, the first-mentioned symptoms are succeeded by paralysis, hectic, and other symptoms of extreme debility.[2] When death takes place, symptoms of putridity are said soon to present themselves, but this is not always the case, although the body is often marked with livid stripes and covered with enchymoses; and on dissection the stomach often, although not always, appears either abraded, or completely eroded in several parts; with appearances of inflammation extending through the whole abdominal viscera. Particles of the arsenic are occasionally found adhering to the abraded parts of the villous coat of the stomach.

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[1] In a case detailed by Dr. Yelloly, no pain of the stomach, convulsions, nor delirium occurred, although it terminated fatally. *Edin. Med. and Surg. Journ.* v. 389.

[2] On this subject our readers will find much practical information in the *London Medical Repository*, vol. v. p. 97.

Various methods of counteracting the poison of arsenic have been recommended. Whatever antidote is adopted, the stomach should, in all cases, be immediately evacuated: and the best mode of doing this is by administering large draughts of tepid mucilaginous fluids. In order to render the arsenic inert, solutions of the alkaline sulphurets, and vinegar, have been advised; but the experiments of Renault have demonstrated how little reliance is to be placed on these articles. Hahneman orders one pound of soap to be dissolved in four pounds of water, and a cupful taken, tepid, every three or four minutes; and as this is the antidote most readily procured, if lime-water or chalk and water cannot be at hand, it should always be the first employed. Lime-water proves useful by coating the particles of the arsenic with an arseniate of lime, which is insoluble, and consequently inert.[1] Dr. Yelloly, reasoning on the probability that the inflammation induced is often the cause of death, even after the stomach is freed from the whole of the poison, suggests the propriety of early blood-letting in these cases.[2]

As medical men are often called upon in courts of law to establish the fact of white oxide of arsenic having been used as a poison, it is necessary to know the best tests by which it may be recognised. If on searching in the stomach, or among its vomited contents, any considerable quantity of the suspected poison be discovered, a little of it must be mixed with three times its weight of black flux; or one of finely-powdered charcoal, and two of dry carbonate of potash; or, to a grain of the poison are to be added half a grain of charcoal, and a grain of dried carbonate of potash. These must be put into a thin glass tube, about eight inches in length and 1-4th inch in diameter, hermetically closed at one end, and thinly coated with a mixture of pipe-clay and sand.[3] The open extremity must then be slightly plugged with a piece of paper (taking care to clean the upper portion of the tube by means of a feather), and the tube kept for a quarter of an hour in a well-burnt coal fire; when, if the powder introduced into the tube contain arsenic, metallic arsenic will sublime and be found lining with a brilliant crust the inside of the tube. That it was arsenic may be further proved by volatilizing a small portion of the reduced metal on a red-hot iron, and observing whether it presents the garlic odour peculiar to the vapour of metallic arsenic. But when the poison is found in very small quantity only, let it be dissolved in two drachms of hot rain or distilled water, with three grains of subcarbonate of potash, or, what is to be preferred, the subcarbonate of ammonia; then add to this, a warm solution of five grains of sulphate of copper, which will produce a lively grass-green precipitate if arsenic be present. When no powder is discovered in the stomach, its contents and the vomited matter must be washed with hot water and filtered, carbonate of potass added to the filtered fluid, and then a warm solution of the sulphate of copper, as above described. A still more delicate test than any of those already mentioned has been proposed by Mr. Hume[1]: one part of the suspected poison, and three parts of subcarbonate of potass, are to be dissolved in a sufficient quantity of rain or distilled water at 212°; and the surface of this solution slightly touched with a piece of nitrate of silver. If oxide of arsenic be present, a sulphur-yellow coloured precipitate will be seen falling rapidly from the point where the nitrate is applied. In our experiments we have found that the sixtieth part of a grain of the oxide is clearly discovered in two ounces of water by this test. All these experiments should be performed in the day-time; and the precipitated fluid examined by reflected, not transmitted light.[2]—But the great difficulty is to detect the presence of the poison in the stomach. Besides examining the contents of this viscus by filtration and dilution, if no arsenic can be detected, Orfila advises the viscus to be cut in pieces, and separately examined[3], by boiling them in water and testing the solution.

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[1] See our experiments on this subject, in the *London Medical Repository*, vol. viii. p. 157.

[2] *Edinburgh Med. and Surg. Journal*, v. 392.

[3] The coating of the tube is not absolutely necessary.

When any of the vehicle in which the poison has been exhibited can be procured, more satisfactory results will be obtained from the examination of it than from that of the contents of the stomach. If it be found in the form of powder, the most satisfactory proof is that of reducing it to the metallic form, as already described; but if the whole of the arsenic be dissolved, it must then be tried by different reagents. One of the simplest methods which I have tried, is the following. Into the suspected solution stir a moderate quantity of charcoal powder; allow it to settle; then pour off the clear supernatant fluid, or filter the mixture; and when the powder which remains on the filter is dry, sprinkle some of it on a red hot poker: if the solution contained arsenic, the odour of garlic will be rendered sensible. This effect becomes more obvious if a few grains of dried subcarbonate of potash be added to the dried charcoal powder.[1] The results from no single test should, however, be relied upon: and as a knowledge of the appearances produced by the four principal reagents usually employed for the detection of arsenic, must greatly facilitate such an examination, we have constructed the following table, from actual experiments; comparing the results obtained from solutions of arsenic with those from solutions of corrosive sublimate, tartarized antimony, and muriate of barytes, which are the only substances likely to be mistaken for arsenic. It is necessary to remark, that the broth employed was made with beef, and contained a moderate proportion of carrots, turnips, and onions; and that the coffee and the tea contained milk and sugar in the usual proportions employed in these beverages.

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[1] *Philosophical Mag.* May 1809.

[2] Bostock—*Edin. Med. and Surg. Journ.* v. 170.

[3] *Traité des Poisons,* &c. par M. P. Orfila, vol. ii. p. 169.

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[1] To ascertain the delicacy of this test, the following experiments were made.—Exp. 1. Half a drachm of white oxide of arsenic being boiled in two ounces of water, and the fluid filtered when cold, it was found to retain 28 grains of the white oxide in solution. Exp. 2. One drachm of this solution being mixed with two ounces of water in a cylindrical glass vessel, so as to form a solution which contained about one part of the oxide for 592 of water, a scruple of finely powdered charcoal was added, and the mixture being well agitated with a glass rod, and allowed to settle, was filtered. The powder when dry, on being thrown upon a red hot shovel, emitted a *very faint* odour of garlic. Exp. 3. The same as the former, except that two drachms of the solution were employed, making the proportion of the white oxide to the water in the diluted solution, as 1 to 308: the garlic odour was *very perceptible*. Exp. 4. Four drachms of the arsenical solution being employed, making the proportion of the white oxide to that of the water in the diluted solution as 1 to about 171, the garlic odour was *extremely strong*. From these experiments it is evident that this test will detect arsenic in any solution strong enough to act as a poison.

COMPARATIVE TABLE of the Precipitates obtained from Solutions of White Arsenic, of Oxymuriate of Mercury, of Tartarized Antimony, and of Muriate of Barytes, with different Tests.

1st Test.—WATER SATURATED WITH SULPHURETTED HYDROGEN GAS.				
Solvents.	Precipitates from Solutions of Arsenic.	Precipitates from Solutions of Corrosive Sublimate.	Precipitates from Solutions of Tartar Emetic.	Precipitates from Solutions of Muriate of Barytes.
Water.	Bright golden yellow, which was deepened by the addition of a few drops of strong acetic acid.[1]	Yellow at the instant of its formation, but soon becoming black. On shaking the tube a dirty white.	Orange, curdy, partly suspended partly thrown down. Ultimately bright orange.	Heavy; and of a dirty, dark brown colour.
Broth.	Scarcely any at first, but on adding a few drops of strong acetic acid, a pale yellow.	Whitish yellow at first, quickly changing to mixed cloats of yellow, black and white.	Pale orange at first, soon changing to a deeper bright orange.	Dirty pale brown, heavy.
Milk.	Little change, but on the addition of a drop of strong acetic acid, a straw-coloured precipitate.	Light ochre, requiring for its formation a large quantity of the test.	Golden yellow, with a shade of orange.	Dirty nankeen, with a shade of brown.
Tea.	At first very pale yellow, after some time a pale greenish yellow. The precipitate was curdy.	Brownish white, and yellow mixed.	Deep orange, curdy, slowly formed, supernatant fluid yellow.	Dirty light brown, deepening as it fell.
Madeira Wine	Turbid, pale yellow, the colour of the wine destroyed.	Muddy, gradually displaying small floating black floculi.	Pale orange, long suspended.	The muriate mixed with white wine is milky.—Not tested.
Port do.	Turbid, paler yellow: the precipitate in both very slowly formed.	Nearly as in the white, like clouds through the purple of the wine.	Dark dirty brown.	Pale brown, heavy.
Coffee.	A deep golden yellow.	Brownish black.	Deep orange brown.	Not tried.
Gruel.	Pale yellow suspended.	Light brown, slowly formed.	Pale orange.	Not tried.

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[1] This precipitate, dried upon a filter, and heated with some caustic potash in a slender test tube, is decomposed in a few seconds, forming a sulphuret of potash, whilst the arsenic is volatilized in its metallic form, and adheres to the sides of the tube. (*Orfila.*)

II. HYDRO-SULPHURET OF POTASH.

Solvents.	Precipitates from Solutions of ARSENIC.	Precipitates from Solutions of CORROSIVE SUBLIMATE.	Precipitates from Solutions of TARTAR EMETIC.	Precipitates from Solutions of MURIATE of BARYTES.
Water	White, with the faintest tint of sulphur yellow, when a large quantity of the test was used.[1]	Black, mottled with yellow.	Bright orange.	Deep olive green.
Broth	Pale, but bright: sulphur yellow.	Clotted heavy, black, mottled with gray.	Dull orange, heavy.	L^t brown, partially suspended.
Milk	Bright golden yellow.	Black, clotted.	Orange.	Brown, greenish when the mixture was shaken.
Tea	A beautiful yellow.	Brownish black.	Reddish orange, floculent.	Not tried.
Coffee	A deep golden yellow.[2]	Nearly black.	Deep brownish orange.	Not tried.
Madeira Wine	Sulphur yellow.	Dirty white, or slate-colour.	Beautiful bright orange.	Vide 1st Table.
Port do.	Fawn colour.	Slate colour, with violet supernatant liquor.[3]	Dark brown, with a tinge of orange.	Violet, heavy.
Gruel	Bright queen's yellow.	Black dense clots.[4]	Orange-clotted.	Dusky yellowish green.

III. SOLUTION OF SULPHATE OF COPPER, with the addition of Ammonia in excess.

Water	Beautiful grass green. It completely disappeared on the addition of a few drops of strong acetic acid.[5]	White, thick and heavy.	Pale, whitish blue, very little thrown down.	Copious, whitish blue.
Broth	Beautiful pale green, suspended.[6]	White curdy, partly suspended, partly thrown down.	Pale, whitish blue, with a tint of green.	Opaque, glaucous.
Milk	Pale greyish green.	Blueish white, curdy.	Whitish blue.	Curdy white, with a tinge of blue.
Tea	Obscure olive; but scarcely a precipitate.	Dirty yellowish white, curdy.	Muddy; pale, blueish green.	Greyish, heavy, supernatant fluid, yellowish green.
Coffee	Dark grass green.	Dirty white.	Dirty blueish green.	Not tried.
Madeira Wine	Greyish, with a slight tint of green.	Heavy clotted white, with a tint of green.	Ærugenous blue.	Vide 1st Table.
Port do.	Clotted, heavy, dark greenish grey.	Heavy, clotted, blueish grey.	Heavy, dirty slate blue.	Dirty, violaceous grey.
Gruel	Beautiful grass green.	Pale blueish white.	Pale blueish green.	Pale, blueish green.

IV. NITRATE of SILVER; a drop or two of Ammonia being previously added to the solutions.

Water	Copious bright sulphur yellow, falling in floculi from the point of contact.[7]	Dull yellowish white, clotted, changing to dirty white	Pale brown.	White, heavy; soon blackening.
Broth	White (owing to the muriate of soda.)	White, copious.	Brownish, mixed with much muriate of silver.	White, dense, curdy.
Milk	White, with a tint of yellow.	Dirty white.	Very pale, scarcely visible brown.	Not tried.
Tea	Yellowish white, which soon blackens.	Dirty white.	Dirty brown.	Not tried.
Coffee	Yellow, remaining unchanged.	White, changing to black.	Not tried.	Not tried.
Madeira Wine	Pale sulphur yellow.	Dirty white, changing to black.	White.	Vide 1st Table.
Port do.	White, becoming brown on exposure to the light.	Ibid.	Dirty white.	Heavy, dirty white.
Gruel	Yellowish.	Dense, dirty white clots.	Not tried.	Dense, clotted, white.

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[1] This test, added to a solution of the phosphates, throws down a greenish yellow precipitate, the supernatant fluid being yellow and turbid.

[2] Lime water, also, added to coffee containing arsenic, throws down a yellow precipitate; although it precipitates the watery solution of arsenic white. (*Orfila.*)

[3] Corrosive sublimate cannot be exhibited with an intention to commit murder, (except by a self-murderer,) in port wine, as it changes the colour of the wine to pale violet.

[4] All the sulphurets, when dried, and heated in a tube with iron filings, afford metallic mercury, which is volatilized, and shows itself in globules upon the sides of the tube.

[5] This test is capable of detecting arsenic in a solution containing $\frac{1}{110000}$ of its weight. (*Orfila.*)

[6] It has been suggested, that onions boiled in broth, or eaten so as to impregnate with their peculiar qualities the contents of the stomach, might produce the same effects on this reagent, as if arsenic were present; but although a green colour is produced, yet no precipitate falls as when arsenic is present.

[7] A similar precipitate is formed by this test, in a solution of any of the phosphates; but the fact of the precipitate being occasioned by arsenic, is easily ascertained by testing a fresh portion of the solution with lime water. If it contain arsenic, a copious white precipitate will be thrown down; if a phosphate only, there is scarcely any change, or at the most a translucent floculent precipitate, which remains long suspended. A new method of employing this test was suggested by Dr. Paris. It is to put upon a piece of clean white paper a broad streak of the suspected fluid; and then run lightly over it a stick of lunar caustic. This is an excellent test, when modified as I have elsewhere (*London Med. Repository*, vol. viii. p. 178.) suggested, by brushing the streak lightly over with liquid ammonia, immediately after the application of the caustic. If arsenic be present, a bright queen's yellow is instantly produced, which remains permanent for nearly an hour: but, when the lunar caustic produces a bright yellow before the ammonia is applied, we may suspect the presence of some phosphate rather than arsenic.

ARTEMISIA. *Spec. Plant. Willd.* iii. 1815.
Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Nucamentaceæ *Linn.* Corymbiferæ *Juss.*
G. 1473. *Receptacle* subvillous or almost naked. *Seed-down* none. *Cal.* imbricate, with roundish converging scales. *Cor.* without rays.
* *Shrubby.*
Spec. 8. A. *Abrotanum*, Southernwood. *Med. Bot. 2d edit.* 52. *t.* 21.
*** *Herbaceous, with the stem somewhat branching, the flowers in panicles, the leaves compound.*
Spec. 26. A. *santonica*, Tartarian Southernwood. *Med. Bot. 2d edit.* 61 *t.* 23.
42. A. *maritima.* Sea Wormwood. *Med. Bot. 2d edit.* 60. *t.* 24. *Smith Flora Brit.* 864.
63. A. *Absinthium.* Common Wormwood. *Med. Bot. 2d edit.* 54. *t.* 22. *Smith Flora Brit.* 864.

1. ARTEMISIA ABROTANUM.[1]

Officinal. ABROTANUM; FOLIA. *Dub.* Southernwood leaves.
Syn. Citronelle Auronne (*F.*) Eberaute, Stabwurz (*G.*) Abrotano (*I.*) Limbriguera (*S.*)

This is a perennial undershrub, a native of the south of Europe, Siberia, China, and Cochinchina. In England, where it is abundantly cultivated, it resists the winter, but very rarely flowers. It rises about three feet in height, with a shrubby branching stem covered with smooth brown bark. The leaves are alternate on long footstalks, irregularly doubly pinnate; the pinnæ linear, concave on the upper surface, convex below, tomentose, and of a pale green colour. The flowers are compound, of a greenish yellow colour, and produced on one-flowered peduncles in axillary spikes at the extremities of the branches. The seeds are naked and solitary.

Qualities. — Southernwood has a strong fragrant odour; and a warm, bitter, nauseous taste. Both water and alcohol extract these qualities; but the alcohol more perfectly than the water, the infusion having scarcely any bitterness. The tincture is of a beautiful green colour, the infusion of a pale olive. The latter strikes a black with sulphate of iron, and precipitates acetate of lead. A small quantity of essential oil is procured by distillation; on which, and a bitter resinous matter, the qualities of the plant appear to depend.

Medical properties and uses. — Southernwood is said to possess tonic, diaphoretic, anthelmintic, and deobstruent properties. It was formerly much used in debilities of the stomach; chlorosis; and jaundice. Externally it has been employed as a discutient and anodyne fomentation for inflammations, pains, tumours, and gangrenous ulcers. But it is very rarely used in modern practice. The dose may be from ℈j to ʒj of the leaves in substance; or of an infusion, made with ʒvj of the leaves and f℥x of water, a cupful, taken twice or thrice a day.

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[1] Ab *αϐϱοτον* inhumanum; vel *αϐϱωτον* cibo inutile. Vide *Alston's Mat. Med.* ii. 65.

2. ARTEMISIA SANTONICA.

Officinal. ARTEMISIÆ SANTONICÆ CACUMINA. *Edin.* SANTONICUM[1]; CACUMINA. *Dub.* The tops of Tartarian Southernwood.
Syn. Sementine (*F.*) Tartarisches Beyfus (*G.*) Santonico (*I.*)

This species of artemisia is a native of Tartary and Persia: but it is cultivated in our gardens, flowering in September. The root is perennial; and the plant has the habits of indigenous field southernwood, but is erect. The stem is panicled, rising two feet in height, and rather hoary. The lower leaves are pinnate, much cut, linear, and hoary. The branches are wand-like; with alternate racemes, recurved, and having flowers all looking the same way. The flowers are solitary, and cylindrical. In the fruiting plant all the stems are erect, and lose their hoariness. The leaves on the branches are very small, linear, and undivided. The receptacle is naked.[2]

The *qualities* and *medical properties* of this plant are nearly the same as those of the former species of artemisia; and it may be used for the same purposes. The worm seeds (*semina Santonici*) of the former pharmacopœias, which were supposed to be the production of this plant, are now properly rejected; as their place can be well supplied with anthelmintics of more certainty.

3. ARTEMISIA MARITIMA.[3]

Officinal. ABSINTHIUM MARITIMUM; CACUMINA. *Dub.* The tops of Sea Wormwood.

This is an indigenous, perennial plant, growing near the sea shores, and in salt marshes, flowering in August. The root is fibrous, and somewhat woody. The stems rise two or three feet in height, are panicled, erect, leafy, furrowed, and hoary. The inferior leaves are pinnate, with three cleft pinnæ; the upper ones variously divided; the highest simple, and the whole entire in the margin, downy on both sides. The flowers are ovate, of a brownish-yellow colour, in nodding racemes. The calyx is woolly on the outside, with a scaly margin; the receptacle is naked, and the ray florets are very few.

Qualities. — The odour is slightly fragrant; and the taste bitter and weakly aromatic. Like the first-described species, its activity seems to depend on a bitter resin and essential oil.

Medical properties and uses. — These are in every respect the same, in a diminished degree, as those of the next species. It is scarcely ever used.

4. ARTEMISIA ABSINTHIUM.[4]

Officinal. ABSINTHIUM. *Lond.* ARTEMISIÆ ABSINTHII FOLIA, SUMMITATES. *Edin.* ABSINTHIUM VULGARE; FOLIA, CACUMINA. The leaves and flowering tops of Wormwood.
Syn. Absinthe commun (*F.*) Wormuth (*G.*) Assenzio (*I*) Artemisio axenjo (*S.*)

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[1] Σαντονιον Dioscoridis.

[2] Willdenow, iii. 1827.

[3] Σεριφιον Dioscoridis.

[4] Αψινθιον Dioscoridis.

Common wormwood is an indigenous perennial plant, growing in dry waste places, and flowering in August. The greater part, however, of that which is used for medicinal purposes is cultivated in the physical gardens.[1] The root is somewhat woody, and branched. The stems rise nearly erect to the height of two or three feet; are branching, angled, and furrowed, with the summits panicled. The lower leaves are bipinnate; the upper pinnatifid or digitated; with oblong obtuse very entire segments. The racemes are erect, and the flowers pedicellated, nodding, hemispherical, and of a brownish-yellow colour. The florets of the disk are numerous, but those of the ray few: and the receptacle is covered with white silky hairs shorter than the calyx.

Qualities. — The odour of common wormwood is strong, and although fragrant, yet to many persons it is very disagreeable; the taste is intensely bitter, slightly pungent, and nauseous. These qualities are given out both to water and alcohol: and a dark-green essential oil, on which the odour depends, is obtained by distillation with water. The watery infusion of the plant has a pale olive colour: sulphate of iron, and of zinc, slowly deepen it to a black; and superacetate of lead throws down a yellowish-green flocculent precipitate. The active parts of the plant seem to be extractive, essential oil, and a small portion of resin. Kunsmuller[2] found in the residue of twelve ounces of the plant after infusion, besides other things, fifty-nine grains of carbonate of lime.

Medical properties and uses. — Common wormwood is the only species of artemisia which deserves to be retained in the list of materia medica. It is tonic, antispasmodic, and anthelmintic; and, when externally applied, is discutient and antiseptic. It has been used with advantage in intermittents, gout, scurvy, and dropsy; and although modern practitioners will scarcely rely on its efficacy in these complaints, yet, it is undoubtedly of some value as a stomachic in dyspepsia and hypochondriacal affections. When it is desirable to free the remedy from its narcotic property, it should be given in decoction, as the boiling dissipates the essential oil on which this depends. The dose in substance is ℈j to ℈ij; and of the infusion, made by macerating ʒvj of the plant in f℥xij of water, f℥j to fʒxij, three or four times a day.[3]

ARUM. *Spec. Plant. Willd.* iv. 477.

Cl. 21. *Ord.* 7. Monoecia Polyandria. *Nat. ord.* Piperitæ *Linn.* Aroideæ *Juss.*

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[1] A good deal is cultivated at Mitcham, in Surry, chiefly for the seed, which is sold to the rectifiers of British spirits at about 30s. per cwt. *Stevenson's Survey*, p. 378.

[2] *Ann. de Chim.* vi. p. 35.

[3] Purl is an infusion of wormwood in ale.

G. 1705. *Spathe* one-leafed, cowled. *Spadix* naked above, female below, stamineous in the middle.

* *Stemless with compound leaves.*

Sp. 17. A. *maculatum.* Arum, or Cuckow-pint. *Med. Bot. 2d edit.* 728. *t.* 249. *Eng. Bot.* 1298. *Smith Flora Britan.* iii. 1024.

Officinal. ARUM; RADIX RECENS. *Dub.* The recent root of Arum.

Syn. Gouet (*F.*) Aronswurzel (*G.*) Aro (*I.*)

This is a perennial indigenous plant, growing under hedges and on the sides of banks in many parts of Britain[1]; flowering in May, and ripening its berries in August. The root is tuberous, about the size of the first joint of the thumb, with many radical fibres issuing from every side. The leaves, which seldom exceed four in number, are radical, supported on grooved sheathing petioles about nine inches long: they are triangular and barbed, five inches in length, and two in breadth at the base, smooth, glistening, of a deep green colour above, and often sparsely spotted with dark brown or black blotches. The flower-stem is a simple, erect scape, six inches high, and obscurely furrowed. The spathe is erect, bellied, pointed above, of a pale green colour, sometimes spotted, withering, and covering the fruit till it is nearly ripe, when it drops. The spadix is enclosed in the sheath, is club-shaped, obtuse, of a purple colour above, and whitish below; collared towards the middle with many sterile filaments; a little lower with numerous sessile anthers; and at the base with many roundish germens, crowned with sessile, simple stigmas. The berries are succulent, of a bright scarlet colour when fully ripe, and contain one or two hard seeds.

For medical use the roots of arum should be dug up in autumn, after the leaves are completely decayed. They may be preserved fresh for nearly a year if buried in sand in a cool cellar.

Qualities.—The arum root is white, and inodorous. When chewed the taste is at first sweetish and soft, but it soon excites a burning, pricking sensation on the tongue and in the mouth, which continues many hours, and is attended with great thirst. Butter, milk, and oily fluids allay these unpleasant sensations. The sliced root applied to the skin, reddens, and excoriates or vesicates it. The acrimonious matter, however, can be washed off from the bruised root by water; is completely dissipated by drying; and abstracted by water and alcohol by distillation, although the fluid receive no sensible impregnation; so that it may be regarded as a vegetable principle sui generis. The recent expressed juice reddens vegetable blues; and has been found to contain malate of lime.[2] The dried root is chiefly fecula, perfectly inert, and saponaceous; and is used in France as a cosmetic, under the name of Cypress powder.

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[1] We have found it in great abundance in the lanes near Ewell in Surry.

[2] *Ann. de Chimie.* xxxv. 153.

Med. properties and uses.—Arum root in its recent state is stimulant, diaphoretic, and expectorant. It has been employed in cachetic, chlorotic, and rheumatic cases; and in humoral asthma. Bergius says, he found it a never-failing remedy for cephalæa sympathica, which resisted all the other means he employed. But the difficulty of procuring arum root always in a state to be depended on, prevents it from becoming a remedy of general utility.

The dose of arum, in substance, may be from grs. x. to ℈j, three or four times a day, combined with any thing which can sheath its acrimony, as mucilage, milk, thick barley-water; or triturated with gum and water, so as to form an emulsion.

ASARUM. *Spec. Plant. Willd.* ii. 858.

Cl. 11. *Ord.* 1. Dodecandria Monogynia. *Nat. ord.* Sarmentaceæ *Linn.* Aristolochiæ *Juss.*

G. 925. *Calyx* three or four-cleft, placed on the germen. *Corolla* none. *Capsule* coriaceous, crowned.

Spec. 1. A. *Europæum*[1]. Asarabacca. *Med. Bot. 2d edit. t.* 66. *Eng. Bot. t.* 1083. *Smith. Flora Brit.* 509.

Officinal. ASARI FOLIA. *Lond. Edin.* ASARUM; FOLIA. *Dub.* Asarabacca leaves.

Syn. Asaret; Cabaret (*F.*) Haselwurtzel (*G.*) Asaro (*I.*) Asaro de Europa (*S.*) Asāroon (*Arab.*) Tuckir (*Hind.*)

This is a perennial plant, a native of several parts of England, particularly Lancashire and Westmoreland: growing in woods and shady places: and flowering in May. The root is creeping, fleshy, and fibrous. The stem short, round, simple, pubescent, generally bearing two leaves only, and one flower. The leaves are opposite, on footstalks three inches long, of a kidney shape, entire, somewhat hairy, and of a deep shining green colour. The flower is on a short terminal peduncle, of an herbaceous colour on the outside, and dusky purple within; and is in some degree hid under the leaves: the calyx is bell-shaped, and three-cleft, with the points of the segments, which are erect, turned inwards: there is no corolla: the filaments are produced beyond the anthers into a hook or little horn; and the style is cylindrical with a six-parted stigma. The seeds are few, contained in a six celled, inferior, coriaceous capsule, egg-shaped, and crowned with the persistent calyx.

As a great deal of the acrimony of asarabacca is lost with keeping, the leaves should be used in as recent a state as possible; and dried without the application of much heat.[2]

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[1] Derived from Ασαρον Dioscoridis, or more probably from the Arabic *Asāroon,* which signifies *astringency.*

[2] The roots, which are not ordered in the British pharmacopœias, contain the same acrid principle as arum; and are violently emetic and cathartic. Their odour, which is not unlike that of valerian, is said to prove fatal to moles. *St. Hilaire, Expos. des Fam. Nat.* vi. 174.

Qualities.—The recent leaves are nearly inodorous; their taste slightly aromatic, bitter, acrid, and nauseous. The decoction is inert, but the watery infusion which has the colour of brandy, possesses the sensible qualities of the leaves. Sulphate of iron changes the colour to a deep olive, throwing down a grayish precipitate.

Medical properties and uses.—The leaves of Asarabacca are emetic, cathartic, and diuretic; but in modern practice they are never used except as an errhine; and, perhaps, as Dr. Cullen has remarked, they form the most useful species of this genus of local stimulants. A proper dose snuffed up the nose for a few successive evenings at bed-time, occasions a copious discharge from the nostrils, which continues to flow for several days. They have been found particularly beneficial in cephalæa, obstinate tooth-achs, chronic ophthalmia, and lethargic affections. The dose of the powdered leaves is grs. iij to grs. v. which should be repeated every night until the full effect is produced, avoiding exposure to cold during its use.

Officinal preparation. *Pulvis Asari compositus.* E. D.

ASSAFŒTIDÆ GUMMI RESINA. Vide *Ferula Assafœtida.*

ASPIDIUM. *Flora Britannica, Smith,* 1118.

Cl. 24. *Ord.* 1. Cryptogamia Filices. *Nat. ord.* Filices *Linn.*

G. 429. (*Smith.*) *Fructification* in roundish points, scattered, not marginal. *Involūcre* umbilicated, open almost on every side.

** *Frond nearly bipinnate.*

Species 4. A. *Filix mas.*[1] Male Fern root. *Med. Bot.* 1*st edit. t.* 49. (*Polypodium Filix mas.*) *Eng. Bot.* 1458.

Officinal. FILICIS RADIX. *Lond.* ASPIDII FILICIS MARIS RADIX. *Edin.* FILIX MAS; RADIX. *Dub.* Root of the Male Fern.

Syn. Fougere (*F.*) Johanniswurtzel (*G.*) Felie Maschia (*I.*) Polypodio helecho masculino (*S.*)

This is a common indigenous, perennial plant, growing in woods and shady places, and flowering in June and July. The root consists of many matted fibres, forming a turfy or cespitose head, of a blackish colour and scaly. The leaves or fronds grow in circular tufts, from a foot to four feet in height, with the stipe and mid-rib chaffy. They are of a bright green colour, lanceolate and pinnate. The pinnæ are at first alternate, increasing in size from the base towards the middle, then decreasing towards the summit of the leaf; each being deeply subdivided into linear obtuse parallel lobes, crenate on the edges. The fructification is like small dots on the back of each lobe, placed in two rows near the base, and distant from the edges; composed of a kidney-shaped shield or involucre, and a pale brown capsule, with a saffron-coloured elastic ring.

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[1] Θηλυπτερις Dioscoridis.

Qualities.—The dried root is nearly inodorous; the taste at first sweetish, then slightly bitter, subastringent; and mucilaginous when chewed. The internal part of the root, which yields a reddish powder, is the portion that is medicinally used.

Medical properties and uses.—This root is astringent, and has been celebrated both by the ancients and the moderns as a powerful anthelmintic. It appears to have been used as such by Theophrastus, Dioscorides, and Galen; but although recommended by Hoffman, yet it was neglected by the moderns, until the publication of Madame Noufer's specific for the tape worm, by the French government, again brought it into notice. According to her plan of administering it, from one to three drachms of the powdered root was directed to be taken in a large cupful of water, in the morning while the patient was in bed: and two hours afterwards a strong cathartic of calomel and gamboge, proportioned to the age and strength of the patient, was given; and, if necessary, the further operation was promoted by a dose of purging salts; nothing but broth being taken till the worm came away. If this, however, did not happen on the same day, the process was ordered to be repeated on the next.

Notwithstanding the celebrity of this remedy, there is every reason for ascribing more efficacy to the cathartic than the fern root; and it may now be rejected altogether from the materia medica, oil of turpentine being a more certain remedy for expelling tænia.

ASTRAGALUS. *Spec. Plant. Willd.* iii. 1256.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. ord.* Papilionaceæ or Leguminosæ *Linn.*

G. 1379. *Legume* generally two-celled, gibbous.

Species.—A. *verus.* True Astragalus. *Olivier Voy. dans l'Empire Ottoman,* v. 342. *pl.* 44.

Officinal. TRAGACANTHA. *Lond.* ASTRAGALI TRAGACANTHÆ GUMMI. *Edin.* Tragacanth.

Syn. Gommi Astraganti (*F*). Traganth (*G*). Draganta (*I.*) Sumégh ulkassael (*Arab.*) Xuttivah (*H.*)

This shrub is a native of the north of Persia, flowering in July and August. It rises 2 or 3 feet only in height, on a stem about an inch in thickness; with many branches closely crowded together, and covered with imbricated scales and spines, formed from the petioles of the former year. The leaves, which scarcely exceed half an inch in length, are composed of 6, 7, or 8 pairs of opposite, villous, stiff, pointed leaflets; and the midrib is terminated with a sharp yellowish point. The flowers are small, yellow, and proceed from the axillæ of the leaves, with cottony bractes. The calyx is five-toothed, and shorter than the corolla, which is papilionaceous.[1]

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[1] Before Olivier discovered that the species of *Astragalus* above described yields the Tragacanth of commerce, this gum was supposed to be yielded by the *A. Tragacantha* of

The gum exudes in summer, more or less copiously according to the heat of the weather, in tortuous filaments, which are allowed to dry on the plant before being collected. A large portion of the tragacanth collected in Persia is sent to India, Bagdad, Bussorah, and Russia. But what we receive is sent to Aleppo, whence it is exported, packed in cases.

Qualities.—Good gum tragacanth is inodorous; impressing a very slightly bitter taste as it dissolves in the mouth. It has a whitish colour, is semitransparent, and in very thin, wrinkled, vermiform pieces: brittle but not easily pulverized, except in frosty weather, or in a warmed mortar. It swells and softens in water, but does not form a homogeneous fluid mucilage, unless triturated after digestion with a large portion of water: but when the water is acidulated with any of the mineral acids, a small portion of it is dissolved. Dr. John has named this species of Gum *Cerasin*, from its being exuded pure from the Cherry tree. Its mucilage differs from that of acacia gum in being precipitated by the superacetate of lead and oxymuriate of tin; and not by silicated potass[2], or the oxysulphate of iron.

Medical properties and uses. — Gum tragacanth is demulcent; and may answer the purposes of the acacia gum; being even better adapted for allaying tickling cough, and sheathing the fauces in catarrhal affections, owing to its greater viscidity. It is chiefly, however, employed for pharmaceutical purposes. The dose is grs. x. to ʒj or more.

Officinal preparations — *Mucilago Astragali Tragacanthæ.* E. D. *Pulvis Tragacanthæ comp.* L.

ATROPA. *Spec. Plant. Willd.* i. 1016.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Luridæ *Linn.* Solaceæ *Juss.*
G. 381. *Cor.* bell-shaped. *Stam.* distant. *Berry* globular, 2 celled.
Species 2. A. *Belladonna.* Deadly Nightshade, or Dwale. *Med. Bot.* 2d *ed.* 230. *t.* 82. *Eng. Bot.* 592. *Smith. Flor. Brit.* 253.
Officinal. BELLADONNÆ FOLIA, *Lond. Dub.* ATROPÆ BELLADONNÆ FOLIA. *Edin.* Deadly Nightshade leaves.

Syn. Belladone (*F.*) Tollkraut (*G.*) Belladonna (*I.*)

Belladonna is an indigenous perennial, found in many parts of Great Britain, particularly in shady places where the soil is calcareous, flowering in June, and ripening its berries in September. The root is thick, fleshy, and creeping; sending up several erect, purple-coloured, herbaceous annual stems, about

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Linnæus, on the authority of Tournefort; or the *A. gummifera*, on that of M. de la Billardière. Perhaps all these species yield it, although the *A. verus* be that from which it is more generally procured. The Kuttirah gum from India has been found not to answer the purposes of the ordinary Tragacanth.

[2] Bostock, *Nicholson's Journ.* lviii. 30.

three feet in height, branching, leafy, round, and somewhat fleshy. The leaves are lateral, in pairs of unequal size, decurrent, on short petioles, egg-shaped, pointed, entire; of a dusky green colour above, and paler below; soft and fatty to the touch. The flowers are supported on one-flowered, solitary, axillary peduncles; large, drooping, and having a faint narcotic odour: the calyx is green, persistent, and deeply divided into five ovate segments; the corolla bell-shaped, of a lurid hue externally, and within dusky or brownish violet, with a yellow variegated base, inclosing five filaments shorter than the corolla, nodding, and bearing large anthers; with a pyramidal germ, supporting a long simple style and two-lobed stigma. The ripe berry is large, seated within the calyx, roundish, with a longitudinal furrow on each side, shining, smooth, and of a deep purple colour; containing many seeds, and a sweetish, violet-coloured juice.

Qualities. — The leaves of belladonna are inodorous; the taste is slightly nauseous, sweetish, and subacrid. It does not lose its active properties by drying. Vauquelin found that the leaves contain a substance, resembling animal albumen, salts with a base of potash, and a bitter principle in which their narcotic quality resides. Every part of the plant is poisonous; and children and the ignorant have often suffered from eating the berries, the beautiful appearance and sweet taste of which render them very alluring. The symptoms which they induce are those of intoxication, accompanied with fits of laughter and violent gestures; great thirst, difficulty of deglutition, nausea, dilatation of the pupil, with the eyelids drawn down; redness and tumefaction of the face, stupor or delirium, a low and feeble pulse, paralysis of the intestines, convulsions and death. Dissections show that the stomach and intestines have been inflamed; and after death the body swells, blood flows from the nose, mouth, and ears; and the most rapid decomposition ensues. The best mode of averting these fatal effects is by exhibiting emetics of sulphate of zinc, or of copper, and assisting their operation by irritating the fauces; then evacuating the bowels by active purgatives and glysters; and following these by large doses of vinegar and other vegetable acids. The recovery is always slow.

Medical properties and uses. — The deleterious effects we have enumerated demonstrate that belladonna is a very powerful narcotic. It is besides diaphoretic, and diuretic. When injudiciously or incautiously given, or when it is taken for a considerable length of time even in small doses, it is apt to induce a dryness and stricture of the pharynx and adjoining parts of the œsophagus, sickness, vertigo, and dimness of sight; symptoms sufficiently indicative of the necessity of suspending its use for some time, and giving it in smaller doses when it is resumed. The internal administration of belladonna appears to have been suggested by the advantages resulting from its external application. Cullen, De Haen, Juncker, and others, found it very serviceable in scirrhous and cancerous affections; and it has also been given with advantage in obstinate intermittents, chronic rheumatism, gout, paralysis, amaurosis, pertussis, and in other spasmodic diseases in which we can speak of its efficacy from our own experience. Hufeland asserts its efficacy in allaying convulsions arising from scrophulous irritation; and its beneficial effects in neuralgia facialis have been well ascertained.[1] Its effects seem to depend altogether on its narcotic powers; but they have not been found sufficiently constant and permanent to insure its general use. Externally, used either as a fomentation, or the dried leaves powdered and sprinkled over the parts, it is of singular efficacy in diminishing the pain of cancerous and ill-conditioned sores: and as the infusion, when dropped into the eye, produces a great dilatation of the pupil, it was proposed by professor Reimarus, and has been used in this country[2], as a mean for assisting the extraction of the cataract. "Its operation appears to be limited to the radiated fibres of the iris."[3] By continued use it loses its effect: but regains it after the application has been, for a short time suspended.

Belladonna may be given in substance, beginning with one grain of the dry leaves powdered, and gradually increasing the dose to 12 or 14 grains; or of an infusion made with one scruple of the dried leaves in ten fluid ounces of boiling water, two ounces may be given daily, and cautiously increased.

Officinal preparations. *Extract. Belladonnæ.* L. *Succus spissatus Atropæ Belladonnæ*, E.

AURANTII BACCÆ. Vide *Citrus Aurantium.*

AVENA. *Spec. Plant. Willd.* i. 443.

Cl. 3. *Ord.* 2. Triandria Digynia *Nat. ord.* Gramina *Linn.*

G. 142. *Calyx* two-valved, many-flowered; with a twisted awn on the back.

Species 13. A. *sativa.* Common Oat.

Off. AVENÆ SEMINA. *Lond. Edin.* The seeds of the Oat, called Grits.

Syn. Gruau d'aveine. (*F.*) Habergriize (*G.*) Avena (*I.*) Avena (*S.*)

The oat was found by Anson growing wild upon the island of Juan Fernandez, on the coast of Chili; but the place whence it was first brought to Europe has never been satisfactorily ascertained. The root is annual and fibrous, pushing up a culm or straw, which rises above two feet in height. The inflorescence is a loose panicle, with the subdivisions on long pendulous peduncles. The glumes of the calyx are two, marked with lines, pointed, unequal, and larger than the flower. There are usually two flowers and seeds in each calyx; they are alternate, conical; the smaller one is awnless: the larger puts forth a strong, two-coloured, bent awn from the middle of the back; both seeds are fertile.

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[1] *Observations on the use of Belladonna. &c.* by John Bailey, 8vo. 1817.

[2] *Med. and Phys. Journal,* No. xxxii.

[3] *Adams's Practical Observations on Ectropium, &c.* 8vo. p. 44.

There are many varieties of this species of grain cultivated in the north of Europe. In this country that which is called *the potatoe oat* is considered the best; its pickle is short and plump, with a thin, clean, bright, pale straw-coloured cuticle.

Oats, when freed from their cuticle only, are named grits; in which state, and ground into meal, they are dietetically and medicinally used. In both states they yield their fecula to water by coction; and form a nutritious amylaceous gruel. The nutrient qualities of oats are well known. In many places the meal forms the chief support of the poor: and for infants who are unfortunately deprived of their natural and proper nourishment, the breast milk, no better substitute can be adopted than thin grit gruel mixed with good cow's milk. The gruel should not be kept longer than forty-eight hours, as it becomes acescent after that period.[1]

Qualities. Oats are inodorous; and taste very slightly, but not unpleasantly bitter. They have not been chemically examined; but the greater part of their substance appears to consist of fecula or starch.

Medical properties and uses. — Gruels, or decoctions of grits or of oatmeal, are excellent demulcents, and therefore very frequently prescribed in inflammatory diseases, diarrhœa, cholera, dysentery, calculus, and febrile affections. They may be sweetened, acidified, or used plain. They are also used locally in glysters; and the meal boiled with water into a thick paste forms an excellent suppurative poultice.

BARYTA. Barytes.

Syn. Baryte (*F.*) Baryterde, Schwererde (*G.*) Barite (*I.*)

This mineral substance does not exist, as far as we know, in an uncombined state; and its native combinations hitherto discovered are very few. It is found

A. Combined with carbonic acid:

Sp. 1. *Carbonate of barytes*, or *Witherite.*[2]

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[1] The following is the simplest mode of making gruel: Put three ounces of grits which have been washed, into four pints of water, and boil slowly until the water be reduced one half; then strain through a searce to separate the undissolved part of the grits from the gruel.

[2] So named by Werner after Dr. Withering who discovered it.

B. ——— with sulphuric acid:

2. *Sulphate of barytes*, or *Heavy spar*.

Barytes is obtained by decomposing these fossils. It is not a simple substance, but a compound of a peculiar metallic base named *barium* by Sir H. Davy[1], and oxygen, in unknown proportions.

1. CARBONATE OF BARYTES.

Officinal. CARBONAS BARYTÆ. *Edin.* Carbonate of Barytes.

Syn. Carbonate de Baryte, (*F.*) Kohlonsaure Baryterde, (*G.*) Ossicarbonato di Barite (*I.*)

This fossil is found native in Sweden, Scotland, and Cumberland; but in greatest abundance at Anglesark, in Lancashire. It usually occurs massive in veins, which traverse the independent coal formation: and sometimes, although rarely, it is found crystallized.

Qualities.—Carbonate of barytes is inodorous and insipid; but is nevertheless poisonous. Its colour is white, or yellowish gray; it is translucent, with a shining, somewhat resinous lustre; and breaks in one direction with a fracture intermediate between radiated and foliated; and in another uneven: the fragments wedge-shaped. Its specific gravity is 4.331. When heated it becomes opaque; is fused into a white enamel by the blow-pipe; and dissolves with effervescence in diluted nitric acid. According to Berzelius, it consists of 78.4 of barytes and 21.6 of carbonic acid in 100 parts.

Use.—It is only used for preparing the muriate.

Officinal preparation. *Murias Barytæ.* E.

2. SULPHATE OF BARYTES.

Officinal. SULPHAS BARYTÆ. *Edin.* Sulphate of Barytes.

Syn. Sulfate de Baryte (*F.*) Schwefelsaures Baryterde (*G.*) Ossisolfato di Barite (*I.*)

This combination of barytes, which was formerly named *Ponderous spar*, is found native in many parts of the world.

Qualities.—Sulphate of barytes is inodorous and insipid. Its colour is white with shades of yellow, red, blue, or brown. It occurs transparent, semitransparent, or only translucent; and is hard, brittle, and heavy, its specific gravity being from 4.3 to 4.5. The varieties of form of its crystals are numerous; but the primitive form is a rectangular prism, the bases of which are rhombs with angles of 101° 30′ and 78° 30′.[2] It breaks with a straight foliated fracture; the fragments are nearly rhomboidal, and have a shining, pearly, almost vitreous lustre. It is fused by the blow-pipe, and converted into the sulphuret; and is soluble in sulphuric acid only, from which it is precipitated by water. The results of experiments to ascertain its constituents have been very discordant: according to Berzelius, they are, 66 of barytes, and 34 of acid.

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[1] Mr. Murray proposes *barytum* instead of barium. *Syst. of Chem.* ii. 205.

[2] Haüy, *Thomson's Chemistry*, iv. 369.

Use.—This barytic salt is introduced into the list of materia medica, merely as a substitute for preparing the muriate of barytes, when the carbonate cannot be procured.

BITUMEN.

Syn. Bitume (*F.*) Erdharze (*G.*) Bitume (*I.*) Bitumen (*S.*)

In the limited signification of this term, it is meant to imply those mineral inflammable bodies, which resemble, in a certain degree, oily and resinous substances. They have been divided into two classes: the first containing bitumens which possess nearly the same properties as the essential oils; the second, those which possess properties peculiar to themselves[1]; and a third class may be formed of those substances in which bitumen predominates with other components.

A. Bituminous oils:
fluid. *Sp.* 1. Petroleum. Var. *a. Naphtha.* *b. Petroleum.*
solid. 2. Maltha, or Sea wax.
solid. 3. Mineral tallow.

B. Proper bitumens:
solid. 1. Asphaltum.
semifluid. 2. Mineral tar.
solid. 3. Mineral caoutchouc.

C. Bituminous compounds:
1. *with resinous matter.* *Sp.* 1. Resinasphaltum.
2. *with charcoal.* 2. Pit-coal. Var. *a. Brown coal.* *b. Black coal.* *c. Glance coal.*

According to Hatchett, the elements of bitumens are carbon, hydrogen, sometimes azote, and probably some oxygen; the action of which on the other principles forms the concrete bitumens.[2]

Officinal. PETROLEUM. *Lond.* BITUMEN PETROLEUM. *Edin.* PETROLEUM BARBADENSE. *Dub.* Petroleum. Barbadoes Tar.

Syn. Petrole (*F.*) Steinshl (*G.*) Petrolio (*I*) Nift (*Arab.*) Mitti tel (*H.*)

Although these names are intended to designate the same substance, yet they are by no means to be regarded as synonymous of the same species of bitumen. The first species of the bituminous oil is properly named by the London college, the second variety of that species being the real petroleum of the shops; but the Dublin college has incorrectly given the second species of the proper bitumens as the synonyme of Bitumen Petroleum.

Petroleum is found in many parts of the world in various states of purity. When free from foreign ingredients, and before it has been long exposed to the action of the air, it is named *naphtha;* of which the purest kind that is brought to Europe comes from Monte Ciaro, near Piacenza in Italy. "This hill consists of horizontal beds of argillite, in which pits are sunk till the water comes in; after which the naphtha oozes out of the sides and floats on the surface of the water, whence it is skimmed off every week."[1] The petroleum of the shops, however, which is much less pure, is procured from Monte Festino, not far from Modena. In the Birman empire there are 520 wells in one district, which yield annually more than 400,000 hogsheads of petroleum.

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[1] *Thomson's Chemistry*, 4th edit. vol. ii. p. 502.

[2] *Linn. Trans.* iv. 129.

Qualities.—Naphtha is of a pale yellowish colour, thin, fluid, light, transparent, odoriferous, unctuous to the touch, and very inflammable. By long exposure to the air, and other circumstances, it passes into the second variety. Petroleum is thicker than naphtha, unctuous to the feel, semitransparent, and of a reddish or blackish brown colour. It has a strong, penetrating, not disagreeable, odour, and a bitter, pungent, acrid taste; is not quite so inflammable as naphtha, and has a much greater specific gravity. When distilled with water, it comes over nearly as clear and fluid as naphtha.

Both these varieties of bitumen combine with fat, resins, essential oil, and camphor: with alkalies they form soapy compounds; and sulphuric and nitric acids change them into solid resins.

Medical properties and uses.—Petroleum is a stimulating antispasmodic and sudorific; and as such has been given in asthma and coughs unattended with inflammation; but it is chiefly used for external purposes, as a stimulant in diseases of the hip-joint, rheumatic, and other chronic pains, chilblains, and to paralytic limbs, applied by friction.[2] It is, however, scarcely ever employed in either way; and on this account is not often to be procured in the shops. The dose of petroleum may be from ♏x to f℥ſs in any convenient vehicle.

BOLETUS. *Spec. Plant. Willd.*

Cl. 24. *Ord.* 13. Cryptogamia Fungi. *Nat. ord.* Fungi *Linn. Juss.*
G.—*Fungus* horizontal, porous beneath.
** Parasitic, stemless.*
Spec. 3. B. *ignarius*. Agaric of the oak. *Sowerb. Fung. t.* 34.
Officinal. BOLETUS IGNARIUS. AGARICUS. *Edin.* Agaric.
Syn. Agaric de chêne (*F.*) Feuerschwamm (*G.*) Esca o fungo preparata (*I.*) Agarico (*S.*) Garikoon (*Arab. and Tam.*)

This species of fungus is a parasitical plant; and is found in Britain, growing upon the decayed trunks of the ash and the oak. The pileus or hat is scaly and convex, but depressed in the centre. When young it is of a light brown colour above, and soft like velvet; white underneath, and covered with a slimy matter: but when mature it changes to dark brown, approaching to black. It is from six to ten inches in diameter; and although generally stemless, yet, it is sometimes supported on a footstalk about an inch in length.[1]

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[1] *Mem. Sci.* 1736, p. 57, quoted by Aikin, *Dict. of Chem.* art. *Bitumen.*

[2] In the West Indies the Barbadoes tar is used both as an internal remedy and an external application in the same cases. Of the Burma Petroleum Dr. Fleming remarks, that in chronic rheumatism he had "found much greater benefit from it, than from the more costly Cajeput oil." *Asiatic Researches.*

The boletus which grows upon the oak is said to be the most valuable. It should be gathered in August or September, and be kept in a dry room. "The way of preparing it is to take off with a knife the white and hard part, till you find a substance so soft as to yield under the finger like shammy leather."[2] This must be divided into different pieces, and beaten with a hammer till they become so soft as to be torn with the finger.

Qualities.—Prepared agaric is inodorous, and has a slightly astringent taste. According to Bouillon la Grange, by whom it has been chemically examined, it contains resin, extractive, something similar to animal gelatin, and different salts.

Medical properties and uses.—Agaric has been much celebrated as a styptic, when externally applied to bleeding arteries and veins. It was introduced by Brossard, a French surgeon, in 1750, and was for some years used both on the continent and in this country: but if it really possess styptic powers greater than those of lint or sponge, which does not appear to be the case, the improved practice of surgery renders all such applications useless.

BONPLANDIA. *Plantæ Equinoctiales.* Tom. ii. p. 59.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Quassiæ *Juss.*

Gen. Char. Calyx Monophyllous, campanulate, 5 toothed. *Corolla* 5 petals, cohering near the base, funnel-shaped.

Spec. 1. B. *trifoliata.* Three leaved Bonplandia. *Humboldt*, l. c. tab. 97.

Officinal. CUSPARIÆ CORTEX. *Lond.* BONPLANDIÆ TRIFOLIATÆ CORTEX. *Edin.* ANGUSTURA; CORTEX. *Dub.* Cusparia bark, Bonplandia bark, or Angustura bark.

Syn. Angusture (*F.*) Angusturarinde (*G.*) Angustura (*I.*)

Although the London College has designated the tree which yields this bark, by the name of Cusparia *febrifuga*, as originally given to it by Humboldt, yet, we have preferred the name imposed by Willdenow, and since adopted by Humboldt.

The Bonplandia *trifoliata*, is a native of South America, growing abundantly in the woods near Carony and Alta Græcia. It is an elegant evergreen, rising to the height of from 60 to 80 feet, having a cylindrical *trunk*, covered with a grey coloured bark, and branching towards the summit. The branches are alternate, the upper ones spreading nearly horizontally. The *leaves*, which are ranged alternately on the branches, are about two feet long, independent of the petiole, and composed of three oblong ovate leaflets, pointed at each extremity, and attached at their bases to a single channelled petiole, from 10 to 12 inches in length. The *leaflets* are glandular, and when fresh, exhale an agreeable, aromatic odour. The *inflorescence* is a terminal raceme, composed of alternate peduncles, bearing from three to six flowers each: the calyx is inferior, persistent, five toothed and tomentose; the corolla is funnel-shaped, and composed of five petals, so united below as to appear as one tube, with a five cleft spreading tube. The *nectary* consists of fine glandular bodies. The *stamens*, which are shorter than the petals, have white filaments supporting oblong yellow anthers; the *pistil* is formed of five oval hairy ovaries, from the centre of which a single style rises, supporting five fleshy green stigmata. The *fruit* consists of five oval, bivalve capsules, each enclosing a single seed. The first parcels of cusparia bark were imported from Dominica in 1778; and the tree yielding it was supposed to be a native of Africa; but importations from Cadiz and the Havannah, and the travels of Humboldt and Bonpland, led to the knowledge of the real place of its growth.[1] It is brought to this country packed in casks; but the original package, Mr. Brande informs us, is curiously formed of the large leaves of a species of palm, surrounded by a kind of net-work made of sticks. It is in pieces of different lengths, some nearly flat, and others in partial quills of all sizes intermixed.

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[1] Withering, *Bot. Arrange.* ii. 767.

[2] *Phil. Trans.* xlix. Part I. 29.

Qualities. — The odour of this bark is not strong, but peculiar; the taste bitter, slightly aromatic, and permanent, leaving a sense of heat and pungency in the throat. The pieces are covered with a whitish wrinkled thin epidermis; the inner surface is smooth, of a brownish yellow colour, and the intermediate substance mottled fawn colour, and of a compact texture. It breaks with a close, short, resinous fracture; is easily pulverized, and affords a powder which, when triturated with lime or calcined magnesia, gives a smell of ammonia. — The active matter is taken up by cold and hot water in infusion; and is not injured even by coction, but the addition of alcohol precipitates part of the extractive. The alcoholic tincture reddens litmus paper, and becomes milky on the addition of water. The watery infusion precipitates the infusion of galls and of yellow cinchona, but not gelatine.[1] I found that it precipitates sulphate of iron, tartarized antimony, sulphate of copper, acetate and superacetate of lead, muriate of mercury, and pure potash yellow; which confirms Vauquelin's analysis. Nitrate of silver also precipitates it yellow, but assumes a violet colour after some time. Ammonia deepens the colour, but is not precipitated. Sulphuric acid gives the infusion a brown colour, and gradually a lemon yellow precipitate is deposited; whilst nitric acid deepens the colour to a blood red, and after some time affords a lemon yellow precipitate. The muriatic acid does not affect it. Sulphuric ether takes up one part from ten of the powder, and when evaporated on water leaves a greenish yellow, very acrid resin, and renders the water milky: the addition of nitro-muriatic acid changes this milky appearance to red, slowly producing a lemon yellow-coloured precipitate, and giving the resin on the side of the glass a brown pink colour. By distillation with water the bark yields a small portion of a white essential oil. These experiments ascertain the substances which are incompatible in prescriptions with infusion, or tincture of cusparia bark; and show that it contains *cinchonin*, *resin*, a peculiar variety of *extractive*, *carbonate of ammonia, and essential oil.*[2]

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[1] See *Brande's Experiments and Observations on the Angustura Bark.*

Medical properties and uses.— Cusparia bark is stimulant and tonic. It was introduced in the West Indies with very high pretensions; and, although it is not superior or even equal to cinchona bark in fevers, yet it is a remedy possessed of very considerable powers. It does not oppress the stomach, but gives to it a degree of warmth; expels flatus, keeps the bowels open, and increases the appetite for food. It is particularly efficacious in bilious diarrhœa and dysentery, after due evacuations; and also proves useful in dyspepsia, hysteria, leucorrhœa, and most of the diseases in which the use of a general tonic is indicated. Mr. Brande published several cases which came under his own observation, and some from the communications of others, in which its usefulness as a remedy for intermittents appears to be confirmed; but this is disputed, particularly by Alibert, who gave it a fair trial in the hospital of St. Louis. My own experience does not enable me to give an opinion on the subject. Its employment is contra-indicated in directly inflammatory complaints, in hectic fever, and colliquative diarrhœa.

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[1] Vauquelin. *Annales de Chimie*, lix. 130.

[2] A species of bark in some respects resembling the Cusparia has lately been introduced upon the Continent, possessing the most deleterious quality. Planche has examined it and named it Angustura ferruginea. It is readily distinguished from the true bark by its greater thickness and weight, and the epidermis being of a brownish olive hue and warty. It impresses also the most nauseous and permanent bitter, when chewed. For particulars regarding it, vide *Orfila's Traité des Poisons*, tom. ii. p. 331, and *The Lond. Med. Repository*.

It may be exhibited in substance, in watery infusion, in tincture, and in the form of watery extract. The powdered bark is given in doses of from grs. v. to grs. xx, beyond which it is apt to induce nausea. It may be combined with neutral salts, magnesia, and testaceous medicines; or with powdered cinnamon, which covers its nauseous taste better than any other thing. Of the aqueous extract grs. x. is a full dose. In large doses all the forms are apt to excite nausea.

Officinal preparations. *Infusum Cuspariæ.* L. *Tinctura Bonplandiæ trifoliatæ,* E. *Tinctura Angusturæ,* D.

BOSWELLIA. *Roxburgh.*

Cl. x. *ord.* 1. Decandria Monogynia. *Linn.*

Gen. Char. Cal. beneath, 5-toothed. *Cor.* 5 petals. *Nect.* a crenulated, fleshy cup, surrounding the lower part of the germ, with stamens inserted on its outside. *Capsule* 3-sided, 3-valved, 3-celled. *Seeds* solitary, membranous, winged.

Species. — B. *Serrata. Asiatic Researches,* 8vo. vol. ix. p. 377.

Officinal. OLIBANUM.[1] *Lond.* JUNIPERI LYCIÆ GUMMI-RESINA. *Edin.* OLIBANUM; GUMMI-RESINA. *Dub.* Olibanum.

Syn. Encens (*F.*) Weirauch (*G.*) Olibano (*I.*) Koondir Zuckir (*Hind.*) Cundur (*Arab.*) Labúniyá (*Syr.*)

Olibanum was supposed, on the authority of Linnæus, to be the production of the Juniperus *Lycia*[2]: but, this opinion appears to be erroneous; for, Mr. Colebrooke has observed, "this species of juniper is a native of the south of France;" and the French botanists deny that it yields the resinous gum in question.[3] On this account, therefore, and influenced by other proofs brought forward by Mr. Colebrooke, we have been induced to regard olibanum as the production of the Boswellia *serrata* of Roxburgh, although it is still referred to the juniperus *Lycia* in the Pharmacopœias.[4]

The Boswellia serrata is a native of the mountains of India; and is vulgarly known under the name of Sálaï. It is a large tree, with the foliage crowded at the extremities of the branches. The leaves are impari-pinnate; consisting of ten pairs of leaflets, sessile, each an inch, or an inch and a half in length, obliquely ovate, oblong, obtuse, serrate, and villous; supported by round, downy petioles. The flowers, which are produced in axillary racemes, shorter than the leaves, are numerous, small, and of a pale pink colour; accompanied with minute bracteas. The calyx is monophyllous, five-toothed, and downy; the corolla composed of five oblong, spreading, exteriorly downy petals; and the nectary a fleshy, crenulate, coloured cup, adhering to the calyx. The stamens are ten, alternately shorter, supporting oblong anthers: the pistillum consisting of an ovate germen, a cylindrical style, and trilobate stigma. The capsule is smooth, three-sided, trilocular, three-celled, and three valved: each cell containing one perfect seed only, which is broad, cordate, and winged.

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[1] Quasi Oleum Libani. Colebrooke, *Asiatic Researches,* 8vo. vol. ix. p. 382.

[2] Λιϐανος Dioscoridis.

[3] *Asiatic Researches,* vol. ix. p. 377.

[4] Although so much used in the early ages as incense in sacrifices, and latterly, in the ceremonies of the Greek and Roman churches, yet, both ancient and modern writers have differed regarding the plant yielding it.

Olibanum is imported in chests and casks from the Levant; and is also sold at the East India Company's sales; but the Indian olibanum is not much esteemed.

Qualities.—Olibanum is a translucent, whitish yellow, brittle substance, generally covered with whitish powder, produced by the friction of the pieces against each other. Its odour when burnt is fragrant; its taste is acrid, bitterish, and somewhat aromatic. When heated, although it melts with difficulty, yet it burns brilliantly, and leaves a whitish ash, composed of phosphate, carbonate, and sulphate of lime, with muriate and carbonate of potash. When distilled alone, it affords a volatile oil; but, when in conjunction with water or alcohol no oil comes over. Alcohol dissolves three-fourths of it, forming a transparent solution; and when triturated with water, a milky solution is produced, from which the resinous matter is deposited after some time; and three-eighths only remain dissolved. Ether takes up rather more than one-half, and when evaporated on water, leaves a very pure transparent resin; while the part undissolved by it becomes white and opaque, and is almost entirely soluble in water, forming a milky solution. Hence olibanum appears to consist of resin, gum, and a volatile oil. This opinion has been lately confirmed by Braconnot, who has analysed olibanum, and found in 100 parts of it, 8 of volatile oil, 56 of resin, 30 of gum, and 5.2 of a matter resembling gum, but insoluble in water and alcohol. The oil resembled the oil of lemons in odour and colour.

Medical properties and uses.— Olibanum is stimulant and diaphoretic. It was formerly much used in affections of the chest, and externally as a vulnerary; but it is now employed only as a perfume in sick rooms.

BUBON.[1] *Spec. Plant. Willd.* i. 1439.
Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.
G. 546. *Fruit* ovate, striated, villose.

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[1] Βουϐωνιον Dioscoridis.

Species 2. B. *Galbanum.* Lovage-leaved Bubon. *Med. Bot. 2d. edit.* 98. *t.* 40.

Officinal. GALBANI GUMMI RESINA. *Lond. Dub.* BUBONIS GALBANI GUMMI RESINA. *Edin.* Galbanum Gum-resin.

Syn. Galbanum (*F.*) Mutterharz (*G.*) Galbanó (*I.*) Galbáne (*S.*) Bārzud (*A.*) Bireejā (*H.*)

This species of bubon is a perennial plant, a native of Africa about the Cape of Good Hope, and of Syria, flowering in June and July. It rises 8 or 10 feet in height, with the stem ligneous at the base, and there furnished with a purplish bark; but the upper part is jointed, branching, leafy, and covered with a glaucous exudation, which can be easily wiped off. The lower leaves are nearly tripinnate, on vaginant footstalks; the uppermost are almost simple, tri-lobed, thickish, irregularly serrated, and of a greyish colour. The flowers are in terminal umbels, the principal umbel being large, and plano-convex. The involucres are composed of twelve narrow, lancet-shaped, membranous, whitish leaflets, bent downwards; but the involucels of only six leaflets. The flowers are all fertile; the petals yellow, with inflected tips: the stamens are longer than the petals, supporting yellow anthers; and the styles two, short and tapering. Each flower is succeeded by two oblong-channelled seeds, having a thin membranous border.

When the stem of the growing plant is broken, or wounded by a knife, a cream-coloured juice flows out; and in this manner the gum-resin is procured, by making an incision, or cutting the stem across a few inches above the root; when it soon concretes, and is fit to be gathered. A small quantity exudes spontaneously from the joints of the stem. The gum-resin is brought to this country from the Levant, in cases or chests, containing from one to three hundred weight each. The best is in ductile masses, composed of distinct whitish tears agglutinated together by a pale brown or yellowish substance. It is generally much mixed with stalks, seeds, and other impurities. The separate tears are considered to be the best part of the mass. When the colour is dark brown or blackish, it must be rejected as bad.

Qualities. — Galbanum has a strong peculiar odour, slightly resembling that of turpentine; and a bitterish, warm, acrid taste. Its specific gravity is 1.212.[2] When triturated with water, about one-fourth of its weight is dissolved, forming a milky solution; but after standing for a little time, four parts are again deposited, and what remains undissolved by the trituration is, exclusive of the impurities, almost completely soluble in alcohol. Wine and vinegar act on it nearly in the same manner as water. Alcohol takes up one-fifth of its weight; and a yellow tincture is produced, which has the sensible qualities of the galbanum, and becomes milky on the addition of water; but there is no precipitate. Proof spirit acts slowly on it, and does not dissolve the whole, the impurities excepted. Sulphuric æther dissolves a considerable portion of galbanum, forming a bright golden-coloured tincture, which, when evaporated alone, or floating on the surface of water, leaves a yellow tenacious resin, that retains in perfection the sensible qualities of the galbanum. The part insoluble in æther is nearly wholly soluble in water. Oxymuriatic acid added to the solutions of galbanum, throws down an insoluble matter which appears to be oxidized extractive. By distillation the gum-resin "yields half its weight of volatile oil, which has at first a blue colour."[1] From our experiments, galbanum appears to consist of resin, volatile oil, gum, and extractive.

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[2] Brisson.

Medical properties and uses. — Galbanum is antispasmodic, expectorant, and deobstruent; and may be placed between ammonia and assafœtida. It has been found useful in hysteria, particularly when attendant on difficult menstruation; and in chlorosis. Externally it is applied as a resolvent and a stimulating suppurative to indolent tumours.

The dose is from grs. x. to ʒj, in pills; or triturated with water so as to form an emulsion. It is generally combined with other gum-resins.

Officinal preparations. — *Pilulæ Galbani comp.* L. *Tinctura Galbani.* D. *Emplastrum Galbani.* D. *Emplast. Galbani compositum.* L.

CALAMINA. Calamine. See *Zincum.*

CALUMBÆ RADIX. *Lond.* COLOMBÆ RADIX. *Edin.* COLOMBO; RADIX. *Dub.* Calumba Root.

Syn. Colombe (*F.*) Kolumbowurzel (*G.*) Colomba (*I.*) Kalumb (*Mozambique*) Columboo vayr (*Tam.*)

The plant which yields this root has not yet been described; but Willdenow supposes it to be a species of Bryonia. The root was formerly erroneously supposed to be named from the principal town in the island of Ceylon, which was regarded as its place of export. It is, however, now known to be a staple article of export with the Portuguese, at Mozambique, whence an entire root was taken to Madras by Mons. Fortin, in 1805, and a plant raised from it there by Dr. Anderson. "From a drawing in the possession of the Linnæan Society, the plant appears to be of the natural order of Menispermæ; but the genus cannot be determined, in consequence of the female flowers not having been as yet seen."[2] The following is the character of the male plant, as drawn up by Dr. Berry. The root is perennial, ramose, (or rather fascicled,) the tubers being fusiform. The stems are annual, withering at the end of seven months, voluble, simple, round, hairy, about the thickness of a pen; bearing alternate, five lobed, five nerved leaves; with entire acuminate lobes; and supported on round hairy petioles, shorter than the leaves. The male flowers are in axillary, solitary, compound racemes, hairy and shorter than the leaves: bearing partial, alternate peduncles with sessile flowers; and lanceolate, ciliated, deciduous bracteas. The calyx is hexaphyllous, three of the leaflets being exterior, and three interior, equal, oblong, obtuse, and glabrous. The corolla consists of six minute petals, each petal being oblong, wedge-shaped, concave, fleshy and obtuse. The stamens are six, a little longer than the corolla, the anthers four-lobed and four-celled, no pistillum. The plant is never cultivated, but grows naturally in great abundance in the forests of Oibo and Mozambique. The roots are dug up in March, but it is the best of the offsets only that are taken. The root is fusiform and fasciculated, each offset being a sessile tuber.

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[1] *Thomson's Chemistry*, 4th edit. v. 142.

[2] *Powell's Translation of the London Pharm.* p. 22.

The dried root is brought to this country packed in bags, and sometimes in cases. It is in transverse sections, generally about one-third of an inch in thickness, and one or two inches in diameter. The bark is thick, and easily detached; internally bright yellow, and covered with a wrinkled olive-brown cuticle. The interior part of the root, which is much shrunk in the centre, is of a pale brownish colour, and has a spongy texture, with darker converging rays, which are the remains of sap-vessels. The pieces are frequently much perforated, evidently by worms, and not, as has been supposed, by stringing to facilitate its drying. Those pieces which have the brightest colour, and are solid and heavy, are the best.

Qualities. — Calumba root, as we receive it, has a very slight aromatic odour, and a bitter taste. It breaks with a starchy fracture, and is easily pulverized. Water at 212° takes up one-third of its weight; and the infusion has all the sensible qualities of the root. These are also extracted by alcohol. The infusion is not altered by solutions of sulphate of iron, nitrate of silver, muriate of mercury, and tartarized antimony; but a copious precipitate is produced by the infusion of galls, and by acetate and superacetate of lead. Hence calumba root appears to contain cinchonin. M. Planche has analyzed calumba root, and found it to contain a large proportion of a peculiar animal substance, a yellow bitter resinous matter, and one-third of its weight of starch. By repeated distillation he also obtained a volatile oil; and from the residue malate of lime and sulphate of lime.

Medical properties and uses. — Calumba root is a powerful antiseptic and tonic.[1] It is frequently employed with much advantage in diarrhœas arising from a redundant secretion of bile, bilious remittent fever, and cholera, in which it generally checks the vomiting. It also allays the nausea and vomiting which accompany pregnancy; and according to Percival it is equally serviceable in stopping the severe diarrhœa and vomiting which sometimes attend dentition.[2] Denman found it more useful than the cinchona in the low stage of puerperal fever.[3] As a tonic, unaccompanied with astringency and little stimulus, it has been recommended in phthisis and hectic fever, to allay irritability, and strengthen the digestive organs; and in dyspepsia. It may be given combined with aromatics, orange peel, opiates, and alkaline, or neutral salts, as circumstances require. We have found the powder, in combination with rhubarb and sulphate of potass, exceedingly serviceable in mesenteric fever.

The dose of the powdered root is from grs. xv. to ʒſs, repeated three or four times a day.

Officinal preparations. — *Infusum Calumbæ.* L. E. *Tinctura Calumbæ.* L. E. D.

CALX. *Edin.* Lime.

Syn. Chaux (*F.*) Kalk (*G.*) Calce (*I.*) Calviva (*S.*) Chunāmboo (*Tam.*) Chunna (*H.*) Ahúck (*A.*)

This earth is very rarely found in an uncombined state[4]; but very abundantly in combination with other substances. It occurs both in the organic and inorganic kingdoms of nature; forming a part of the bodies of animals and of vegetables; existing in the water of most rivers, and of the ocean; and as a principal constituent of many fossils, soils, and mountains. The following species only of the fossils in which it is found in combination with carbonic acid require to be noticed.

Nearly pure in:

Sp. 1. *Chalk.*
2. *Limestone.* Subsp. 1. *Compact limestone.*
Var. a. Common. *b.* Roe-stone.
3. *Foliated limestone.* *Var. a.* Granular foliated, or statuary marble. *b.* Calcareous spar.
4. *Fibrous limestone.* *Var. a.* Common fibrous, or satin spar. *b.* Calcsinter, or Stalactite.
5. *Pea-stone.*

By exposing any of these carbonates to a strong heat the carbonic acid is driven off, and lime, or quicklime, as it is commonly called, is obtained; the properties of which shall be noticed under the title *Calx*, among the preparations. It is not, however, perfectly pure, but contains generally portions of silex, argil, or magnesia. To obtain pure lime, let white marble be dissolved in dilute muriatic acid, leaving an excess of marble undissolved. A solution of pure ammonia being added to the solution of marble will indicate by a precipitate the presence of argil and magnesia, which are to be separated by filtration; and the lime itself precipitated in the form of carbonate by a solution of pure sub-carbonate of potash. This precipitate, after it is washed with water and dried, and exposed to a very violent heat in a platinum crucible, is pure lime.[1]

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[1] The Africans of Mozambique esteem it as a remedy for venereal affections; and the Chinese employ it as an aphrodisiac.

[2] *Medical and Experimental Essays,* vol. ii.

[3] *Introduction to the Practice of Midwifery,* ii. 524.

[4] Monnet affirms that it exists in the mountains of Upper Auvergne, mixed however, with a little oxide of iron. *Monnet's Mineralogy,* 515.

Until the introduction of the galvanic battery as a chemical agent, lime was regarded as a simple substance; but it has since been found to be a compound of a peculiar metallic base, named *calcium* by Sir H. Davy, and oxygen, in unknown proportions.[2] We have here to notice the calcareous fossils only which are medicinally used.

1. CHALK. *Friable carbonate of lime.*

Officinal. CRETA. *Lond. Dub.* CARBONAS CALCIS. *a.* MOLLIER, *Creta alba. Edin.* Chalk.

Syn. Craie (*F.*) Kreide (*G.*) Gasso (*I.*) Greda (*S.*) Khurree muttee (*H.*) Kilo (*A.*)

This mineral is found in the north of France, Poland, some of the Danish islands, and in great abundance in the south of England, within a range which commences at Flamborough Head, in Yorkshire, and is continued, with irregular interruptions, through the midland counties to Surrey, Sussex, Hampshire, and into Dorsetshire. It generally occurs massive in beds; and contains numerous relics of marine animals, and occasionally those of the hard parts of land animals.

Qualities. — Chalk is inodorous and insipid; but adheres slightly to the tongue. Its colour is either white, or yellowish, or grayish white. It feels meagre and rough; is not very hard, but is pulverulent; breaks with an earthy fracture; stains the fingers, and marks. Its specific gravity is from 2.3 to 2.6. It effervesces with acids; and generally contains, besides lime and carbonic acid, a small portion of argil. The average proportion of lime is 53 per cent.

Medical properties and uses. — Chalk is antacid; but it must undergo levigation and washing, before it can be internally administered. In powder it is externally advantageously employed as an absorbent in burns and excoriations.

Officinal preparations. *Creta preparata.* L. E. D.

2. LIMESTONE. *Hard carbonate of lime.*

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[1] Chenivix, *Memoirs of the Irish Academy*, 1802.

[2] *Phil. Trans.* 1808.

Officinal. LAPIS CALCAREUS. *Lond.* CARBONAS CALCIS. *b.* DURIER, *Marmor album.* Edin. Limestone. White Marble.

Syn. Pierre à chaux; chaux carbonatée (*F.*) Kalkstein (*G.*) Marino; ossiearbonato di calce (*I.*) Chunamboo kulloo (*Tam.*)

Although all the varieties of limestone before enumerated may be regarded as officinal, in as much as they all yield pure lime when burnt, yet the two varieties particularly designated are *var. a* of the first subspecies, *common compact limestone*, and *a* of the second subspecies, *granular foliated limestone*, or *white Carrara marble*. The first is found abundantly in Britain, in extensive strata connected with floetz and coal formations: the second is brought from Carrara and Paros, and belongs exclusively to the primitive and transitive mountains.

Qualities. — *Common limestone* is inodorous and insipid. Its usual colour is some shade of gray; and sometimes it is variegated with veins, stripes, and clouds of yellow, flesh red, and greenish gray. It is hard and brittle; the fracture splintery; the fragments sharp-edged, and scarcely translucent. Its specific gravity is from 2.6 to 2.7. *White marble* differs from limestone in its granular texture, white colour, foliated fracture, and its internal pearly vitreous lustre. Its specific gravity is from 2.7 to 2.84. Both varieties dissolve in acids with effervescence; and contain about 55 per cent. of lime.

Use. — Limestone is chiefly used for obtaining pure lime.

CANCER. *Syst. Nat. Gmelin.* 2963.

Ord. 7. Insecta, Aptera.

G. 270. *Feet* eight, (sometimes six or ten,) two of them with claws. *Palpi* six, nearly equal. *Eyes* two, distant, moveable, in many of the species standing on elongated peduncles. *Mandibule* horny, thick. *Lip* triple. *Tail* jointed and unarmed.

Sp. 27. C. *pagurus.* Black-clawed Crab. *Brit. Zoology*, iv. 4. *t.* 3.

Sp. 63. C. *ostacus.* The Crawfish. *Brit. Zoology*, iv. 9. *t.* 15. *f.* 27.

1. CANCER PAGURUS.

Officinal. CHELÆ CANCRORUM. *Edin.* CANCER; CALCULI OCULI DICTI[1]; CHELÆ. *Dub.* Crab's Claws.

Syn. Bras de Cerevisse (*F.*) Klaua an Krabbe (*G.*) Forbici dè Granchi (*I.*) Pierna de Cangrejo (*S.*)

The black-clawed crab frequents the rocky coasts of the North Sea, and the British isles; and is considered delicious food. The thorax is obtusely scalloped; the body smooth; and the front five-toothed. The hind feet are subulate; but the fore furnished with large claws tipped with black. It annually casts its shell between Christmas and Easter.

Mr. Hatchet found that the crustaceous covering of crabs and lobsters consists of carbonate of lime, phosphate of lime, and a cartilaginous matter, possessing the properties of congulated albumen. The first of these constituents predominates; and it is on it that the medical properties of the claws depend. They are now deservedly rejected by every judicious practitioner, chalk answering much better every purpose for which they can be prescribed.

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[1] This is an error of the Dublin College, as these calculi are never procured, at least for medical use, from the crab, but always from the crawfish.

2. CANCER ASTACUS.

Officinal. LAPILLI CANCRORUM. *Edin.* Crab Stones.

Syn. Krabsangen (*G.*)

The crawfish frequents rivers, forming its holes in their clayey banks. It is small, in some degree resembling the lobster in shape. The snout is projecting, and serrated on the sides: the thorax is smooth; as is also the back, which has two small spines on each side. The large claws are beset with small tubercles: the two first pairs of legs are clawed; the two next subulated; and the tail has five joints, with the fins rounded.

The concretions, called eyes, are found in the stomach, one on each side, before the fish casts its shell in July, at which time the inner coat of the stomach also is renewed. They are said to be destined for assisting in the formation of the new shell. At Astracan, where the greatest number of these concretions are procured, the crawfish are bruised with mallets, and allowed to putrify in heaps; after which their remains are washed, and the stones picked out.

Qualities.—They are whitish, or reddish, hard and stony, of very different sizes, weighing from one grain to twelve grains each; round and convex on one side, and a little concave on the other: the texture laminated; inodorous and insipid. Their constituents are the same as those of the crab's claws. They effervesce in acids; but instead of dissolving altogether they become soft, transparent, and retain their original form; by which means the real stones are easily distinguished from counterfeited imitations.

Medical properties and uses.—These concretions are absorbent, and slightly antacid: and when prepared by trituration and levigation, are employed in dyspepsia, and other diseases attended with acidity of the primæ viæ; but as chalk answers better in these cases, they may well be dispensed with.

The dose is ʒj or ʒij, suspended in a proper fluid.

Officinal preparations. *Cancrorum Lapilli præparati.* E.

CANELLA. *Spec. Plant. Willd.* ii. 857.

Cl. 11. *Ord.* 1. Dodecandria Monogynia. *Nat. ord.* Oleraceæ *Linn.* Meliaceæ *Juss.*

G. 942. *Cal.* three-lobed. *Pet.* five. *Anthers* 16, adhering to a pitcher-shaped nectary. *Berry* one-celled, with two or four seeds.

Species 1. C. *alba.*[1] White or Laurel-leaved Canella. *Med. Bot.* *2d edit.* 694. *t.* 237. *Trans. Linn. Soc.* vol. i. 96. *t.* 8.

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[1] This plant has been often confounded with the *Wintera aromatica*, an error authorised in some degree by Linnæus, who combined the two genera of Winterana and Canella under

Officinal. CANELLÆ CORTEX. *Lond.* CANELLÆ ALBÆ CORTEX. *Edin.* CANELLA ALBA. *Dub.* Canella Bark.

Syn. Cannelle blanche (*F.*) Weisser Zimmet (*G.*) Cannella bianca (*I.*)

This tree is a native of the West India islands, growing in the inland woods. It rises very straight, from ten to fifty feet in height. The branches are erect, not spreading, and only at the top of the tree; furnished with petiolated leaves, irregularly alternate, oblong, obtuse, entire, nerveless, of a dark green colour, thick and shining like those of the laurel, and emitting a similar odour. The flowers, which exhale a powerful aromatic perfume, are small and of a violet colour, seldom opening, and grow in clusters upon divided footstalks at the summits of the branches. The calyx is of one piece, small, persistent, and deeply tripartite; the petals are five times as long as the calyx, oblong, sessile, concave, erect, two a little narrower than the others; the nectary is pitcher-shaped, antheriferous, and deciduous. The anthers are 21 in number, distinct, fixed longitudinally to the outside of the nectary, and discharge a yellow pollen. The germen is superior, ovate; the style cylindrical, with two rough, convex, blunt stigmas: the fruit an oblong, one-celled, glossy black berry.

The inner bark of the branches is freed from the cuticle, and dried in the shade. It is brought to this country packed in casks and cases, in long pieces, some rolled in quills, and others flat; the quilled sort is considerably thicker than cinnamon, and the flat nearly one-fourth of an inch in thickness.

Qualities.—The quilled pieces of canella are of a whitish yellow colour on both sides, and break with a starchy fracture; the flat pieces, which appear to be the bark of the larger branches or of the stem, are yellow on the outside, and pale brown within. The odour of both kinds when fresh broken is aromatic, something like a mixture of cloves and cinnamon: and the taste slightly bitter, extremely warm, and pungent. Although boiling water takes up nearly one-fourth of the weight of the bark, yet the infusion possesses but little of its warmth and pungency; the bitter chiefly predominating. Alcohol extracts all its qualities in perfection: the tincture is bright yellow, and becomes milky on the addition of water. The infusion is not altered by infusion of galls, sulphate of iron or zinc, muriate of mercury, or tartarized antimony; but nitrate of silver and acetate of lead render it milky, and throw down precipitates. By distillation with water, Canella alba affords a thick, heavy

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the name of *Laurus Winterana*; but afterwards made this a distinct genus under the title *Winterania*, a name by which it was known till Professor Murray corrected the error and made a distinct genus of Canella. Vide *Syst. Veg.* 14th edit. 443. Sir Hans Sloane stated the error of confounding this bark with the Cortex Winteranus, in his description of the tree in the *Phil. Trans.* xvii. 465.

yellow, very pungent, gratefully odorous essential oil; on which and a little bitter resinous matter its virtues seem to depend.

Medical properties and uses. — This bark is stimulant, and slightly tonic. It is a useful adjunct to bitters in some cases of dyspepsia and atonic gout; but it is employed chiefly on account of its flavour, and to correct the griping quality of the resinous cathartics. It is said to prove useful in scurvy.[1]

The dose of the powdered bark is from grs. x. to ʒſs.

CAPSICUM. *Spec. Plant. Willd.* i. 1050.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Luridæ *Linn.* Solaneæ *Juss.*

G. 334. *Corolla* wheel-shaped. *Berry* without juice.

Sp. 1. C. *annuum.* Annual Capsicum. *Med. Bot. 2d edit.* 226. *t.* 80.

Officinal. CAPSICI BACCÆ. *Lond.* CAPSICI ANNUI FRUCTUS. *Edin. Dub.* Berries of the Capsicum, or Cayenne Pepper.

Syn. Poivre d'Inde (*F.*) Spanisdier oderturkircher pfiffer (*G.*) Pepperone (*I.*) Pimienton (*S.*) L'ul Mirch (*H.*) Brāhn Maricha (*San.*)

This is an annual plant, a native of both the Indies; and frequently cultivated for ornament in our gardens. It flowers in June or July. The stem is herbaceous, roundish, smooth, crooked, branching, and rising two or three feet in height. The leaves are ovate, smooth, entire, placed on long footstalks in an irregular order. The flowers are peduncled, axillary, solitary, and white: the calyx is persistent, tubular, and divided at the edge into five short segments; the corolla wheel-shaped, five cleft, the segments pointed and plaited: the filaments are short, tapering, with oblong anthers; and the germen is ovate, supporting a slender style, which is longer than the filaments, and terminated by a blunt stigma. The fruit is a long conical, pendulous podlike berry, of a shining orange, scarlet, or sometimes yellow colour, two-celled, and containing a dry spongy pulp with several flat kidney-shaped seeds.

There are many varieties of this species of capsicum; and they, perhaps, all enter into the composition of Cayenne pepper; but, certainly, the best, which is brought home from the West Indies, ready prepared, is made from the Capsicum *baccatum* (Bird pepper). The difference, however, consists chiefly in the degree of pungency. These peppers, which are generally used instead of the berries, are often mixed with muriate of soda; and sometimes with a less innocent substance, the red oxide of lead. This fraud may be discovered by boiling some of the suspected pepper in vinegar, and after filtering the decoction, adding to it a solution of sulphate of soda. If the pepper contained oxide of lead, a white precipitate will be produced, which after being dried, and exposed to heat, mixed with a little charcoal, will afford a globule of lead.

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[1] This bark and the fruit of the capsicum were formerly common ingredients in the food and drink of the Caraibs, the ancient natives of the Antilles; and at present enter the meagre pot of the negroes. *Linn. Trans.* l. c.

Qualities. — Capsicum berries have an aromatic odour, which is somewhat impaired by drying; and an aromatic, extremely pungent, acrimonious taste, setting the mouth, as it were, on fire, and the impression remaining long on the palate. These sensible qualities are imparted to water, and still more perfectly to alcohol and æther. Half a drachm of the powder infused in f℥jſs of boiling water, lost grs. xij. The infusion was precipitated by infusion of galls, and alcohol dissolved the precipitate. It was also precipitated by nitrate of silver, oxymuriate of mercury, acetate of lead, the sulphates of iron, zinc, and copper, and the alkaline subcarbonates: but was not altered by the mineral acids, the solution of potass, nor silicized potash; and the colour was not changed by the above-named sulphates. The etherial tincture, when evaporated on the surface of water, left an orange-coloured resin, in which the pungency of the capsicum was concentrated. These experiments point out the substances which are incompatible in formula with infusions of capsicum; and lead to the conclusion that it contains chiefly cinchonin, a resin in which the acrimony resides, and vegetable mucus.

Medical properties and uses. — The fruit of the capsicum, or Cayenne pepper, is a powerful stimulant, unaccompanied with any narcotic property. It has been successfully given in atonic gout; in dyspepsia, when accompanied with much flatulence; in tympanitis, and paralysis. In dropsies, and other cachectic complaints when chalybeates are indicated, a small portion of powdered capsicum is recommended as an excellent addition by Dr. Wright; and Bergius says he used it with success in obstinate intermittents.[1] It has also been found beneficial in lethargic affections: but the diseases that capsicum has been found most useful in, are cynanche maligna, and scarlatina maligna, in which it is given both internally, and used as a gargle. Its sensible effects are heat in the stomach, and a general glow over the body, without much affecting the pulse; and as a gargle it cleans, without impeding the healing of the ulcers of the fauces. Cataplasms of capsicum operate as powerful rubefacients without blistering the skin, and are used in the West Indies to relieve the coma and delirium which almost constantly attend tropical fevers. The diluted juice of the fruit is said to be a sovereign remedy in ophthalmia from relaxation.

Capsicum may be given in the form of pills, in doses from grs. vj to grs. x; or fʒj to fʒij of a tincture made with ʒiv of *capsicum* and f℥viij of *alcohol.* The gargle usually employed is made by kneading into a paste ʒj of *Cayenne pepper* and ℈j of *common*

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[1] *Mat. Med. e Regno Veg.* i. 144.

salt; then adding fʒvj of boiling water; and to the solution, strained when cold, fʒiv. of vinegar. But a simple infusion in the proportion of gr. j. of the pepper to f℥j of boiling water answers equally well.

CARBO LIGNI. *Lond. Edin. Dub.* Charcoal.

Syn. Charbon de bois purifieè (*F.*) Reine Kohle, (*G.*) Carbone di legna, (*I.*) Carbon de lena, (*S.*) Koÿla, (*H.*) Zughal, (*A.*) Arang, (*Malay.*)

Charcoal is prepared for the common purposes of fuel, by piling up billets of wood into conical heaps, which are covered with earth and sods, and then burned, with as little exposure to the action of the air as possible: but for the preparation of the finer charcoal, fit for medicinal use, the following process is employed. The wood to be charred is put, in the form of chips or of sawdust, into a large cast-iron cylinder fixed in masonry over a grate. This cylinder terminates at one end in a curved pipe, and the other end is furnished with a door, which is accurately closed after the wood is introduced, and a fire lighted in the grate: the water, empyreumatic acid, and volatile parts of the wood are driven off through the curved tube by the heat, which is increased until the contents of the cylinder become red-hot. The fire is then withdrawn, the cylinder is allowed to cool; and a black shining, pure charcoal is thus obtained.[1] For internal use, however, it is perhaps necessary to have it still purer; and to effect this the process of M. Lowitz is to be preferred. The charcoal is to be reduced to fine powder, and put into a crucible (so as to fill it), on which a pierced cover must be luted. This vessel is then to be heated red-hot, and kept so, as long as a blue flame appears to issue from the hole in the cover; and when this stops it is to be taken from the fire, cooled in a dry place, and the charcoal instantly put into well-stopped bottles for use.[2]

In whatever manner charcoal is prepared, the purest contains generally about one-fiftieth of its weight of earths, salts, or metallic matters; its other constituents are, according to Doberiener[3], 68.4 of carbon, with 1.5 of hydrogen, and a minute portion of oxygen.

Qualities. — Pure charcoal is inodorous and insipid; black, shining, and brittle. When newly prepared it absorbs air and moisture from the atmosphere, so as to increase its weight from 10 to 18 per cent. It is insoluble in water; brittle and easily pulverized, and when excluded from air is not affected by the highest degrees of heat. It corrects the fœtid odour of putrifying animal and vegetable substances; and destroys the odour, taste, and colour of others, particularly of mucilages and oil, and matters in which extractive abounds. Thus common vinegar boiled in charcoal powder becomes colourless; water which has become fœtid at sea is purified by filtering it through charcoal; that intended for long voyages may be preserved perfectly pure by thoroughly charring the insides of the casks; and the empyreumatic odour and tastes of oils, as well as their adventitious colour, and the colour of the varieties of ardent spirits, of litmus, indigo, and other colouring matters dissolved or suspended in water are destroyed by running them through newly-prepared charcoal powder. It also deoxidizes most of the acids.

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[1] This process was invented by Bishop Watson, for the use of the gunpowder manufacturers who require a very pure charcoal. *Aikin's Chem. Dict.* art. *Carbon.*

[2] *Crell's Chemical Journal*, ii. 270.

[3] *Schweizger's Journal*, xvi. p. 92.

Medical properties and uses.—Charcoal is evidently an antiseptic; and as such has been given internally to correct the putrid eructations of some kinds of dyspepsia. But, in order that it may produce this effect, it should either be newly prepared, or such as has been preserved in very well-stopped bottles. It is probable that it operates both by correcting the fœtor, and absorbing the gas generated in the stomach, as well as checking the decomposition of the undigested aliment. Dr. Caliagno, an Italian physician, proposed to employ it instead of cinchona in intermittents[1]; but this suggestion has not been supported by British practitioners. It has been applied advantageously mixed up in powder with boiled bread, or linseed meal and water, as a poultice to foul ulcers and gangrenous sores; and it is, undoubtedly, the best tooth-powder known.

The dose of charcoal may be from grs. x to ʒj, combined with rhubarb.

CARDAMINE. *Spec. Plant. Willd.* iii. 481.

Cl. 15. *Ord.* 2. Tetradynamia Siliquosa. *Nat. ord.* Siliquosæ.

G. 1237. *Pods* opening elastically, with revolute valves. *Stigma* entire. *Calyx* somewhat gaping.

*** *With pinnate leaves.*

Sp. 19. C. *pratensis.*[2] Cuckow Flower. *Med. Bot. 2d edit.* 396. *t.* 133. *Smith's Flora Britan.* ii. 699.

Officinal. CARDAMINES FLORES. *Lond. Edin.* CARDAMINE; FLOS. *Dub.* The flowers and leaves of Cuckow Flower.

Syn. Cresson de Pres, (*F.*) Weissenkresse, (*G.*)

Cuckow flower is a perennial, indigenous, herbaceous plant, which grows in moist meadows, and flowers in April and May. The root is tuberous, and somewhat toothed. The stem rises about nine inches in height, is erect, smooth, stiffish, somewhat angular, and a little branched at the top: the leaves are dark green, pinnated; the radical ones petiolate and spreading; those of the stem almost sessile; the leaflets are four pair or more, opposite, with a terminal one; on the lower leaves they are roundish, and irregularly dentated; but become more entire, linear, pointed, and concave, the nearer they are to the top of the stem. The flowers terminate the stem in a corymb, and stand upon smooth naked peduncles. The calyx is yellowish green, composed of four concave, oblong, nearly obtuse, deciduous scales, alternately larger, and protuberant at the base: the corolla is cruciform, the petals large, of a very pale purple colour, or white, ovate, veined, and slightly emarginate; with a yellowish green base. The filaments are six, four long, standing above the corolla, and two short almost hid, supporting small, oblong, yellow anthers; and invested at the base with four nectareous glands. The germen is the length of the stamens, slender and round, with a sessile stigma: it becomes a bivalved compressed pod, an inch in length, which, when the seeds are ripe, opens elastically, and rolls back in a spiral form. The seeds are many and round.

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[1] Vide *London Med. Repos.* vol. iii. p. 7.

[2] *Σισυμβρίον ἕτερον* Dioscoridis.

Qualities. — Every part of the plant is inodorous; but the flowers and leaves are slightly bitter and pungent, having in an inferior degree the taste of water-cresses. The leaves are often added to spring salads.

Medical properties and uses. — Cardamine flowers are said to be diuretic, and antispasmodic. Their efficacy in spasmodic diseases was first mentioned by Dale[1], on the authority of a MS. of Doctor Tancred Robinson; and they were afterwards, in the year 1767, strongly recommended by Sir George Baker[2], who had successively used them in the cure of chorea, spasmodic asthma, and some other convulsive affections. Dr. Odier of Geneva[3] mentions a case of *incubus* which was cured by their use, although it had resisted several other antispasmodic medicines. They sometimes produce diaphoresis, but have otherwise little sensible operation. They are seldom used. The leaves have been regarded as possessing antiscorbutic qualities, but they have very little efficacy. The dose of the dried flowers powdered is from one drachm to three drachms, given twice or thrice a day.

CARUM. *Spec. Plant. Willd.* i. 1470.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 561. *Fruit* ovate-oblong, striated. *Involucre* one-leafed. *Petals* keeled, inflex emarginated.

Sp. 1. C. *Carvi.*[4] Common Carraway. *Med. Bot. 2d ed.* 102. *t.* 41. *Eng. Bot. Smith's Flora Britan.* 330.

Officinal. CARUI SEMINA. *Lond. Edin.* CARUON; SEMINA. *Dub.* Carraway seeds.

Syn. Carvi (*F.*) Kümmelsamen, (*G.*) Carvi, (*I.*) Alcaronea, (*S.*)

Carraway is an indigenous, biennial, umbelliferous plant, growing wild in meadows and pastures; but cultivated in several parts, particularly in Essex, for the sake of its seed. The

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[1] *Pharmacol.* 204.

[2] *Med. Trans.* i. 442.

[3] *Manuel de Médicine Pratique, &c.* Lect. 16.

[4] Καστορος ορχις Dioscoridis. Careum, non Carum, Latine dici deberet. Conf. *Plin.* l. xix. sect. 49. *Gærtner.*

flowers expand in May and June, and the seeds ripen in August. The root is fusiform; the stem smooth, channelled, branching and seldom exceeding three feet in height; with smooth, doubly pinnate, incised leaves, the pinnulæ or segments of which are narrow, linear, pointed, and of a deep green colour. The flowers are in numerous terminal erect umbels, generally of ten rays, furnished with an involucre consisting of narrow leaflets, solitary, or two or three together, often altogether deficient; and without any partial involucre. The petals of the flowers are five, nearly equal, keel inward, obtuse, inflected, white, or of a pale blush colour; the filaments slender, rather longer than the petals, and bearing small roundish anthers; and the germen inferior, supporting very short capillary styles with simple stigmas. The seeds are two, oblong, bent, about one-fourth of an inch in length, of a brown colour, with five moderately elevated, longitudinal, straw-coloured ridges, the interstices being also obscurely furrowed. Carraway plants do not perfect their seeds until the second year. They are cut down in July, and the seed thrashed out on a cloth. The seeds are used by the London confectioners and bakers, as well as for medicinal purposes.

Qualities. — Carraway seeds have a pleasant aromatic odour, and a sweetish, warm, pungent taste; depending on an essential oil which is almost completely extracted by rectified spirit, and in an inferior degree by water. By distillation with water the whole is elevated, and an insipid extract remains.

Medical properties and uses. — These seeds are carminative and stomachic. They are used in flatulent colic and hysteria; and to give warmth to purgatives and other active remedies.

The dose in substance is from grs. x. to ʒij.

Officinal preparations. *Oleum Carui.* L. D. *Aqua Carui.* L. *Spiritus Carui.* L. E. D.

CASSIA. *Spec. Plant. Willd.* ii. 513.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Lomentaceæ *Linn.* Leguminosæ *Juss.*

G. 813. *Cal.* five-leaved. *Petals* five. *Anthers* three superior, barren; the three lower ones beaked. *Lomentum.*

* *Sennas.*

Sp. 18. C. *Fistula.* Purging Cassia. *Med. Bot. 2d ed.* 445. *t.* 160.
Sp. 24. C. *Senna.* Senna. *Med. Bot. 2d ed.* 442. *t.* 159.

1. Cassia Fistula.[1]

Officinal. Cassiæ pulpa. *Lond.* Cassiæ fistulæ fructus. *Edin.* Cassia fistularis; fructus pulpa. *Dub.* Cassia pulp.

Syn. Casse (*F.*) Rohnkassie (*G.*) Polpa di Cassia (*I.*) Fistularis (*S.*) Ameltás (*H.*) Suvernaca (*San.*)

This tree is a native of both the East and West Indies, and of Egypt. It rises to the height of forty or fifty feet, with a large trunk, covered with a soft cineritious bark, and much branched at the top. The leaves are composed of six pairs of ovate, pointed, undulated pinnæ, of a pale green colour, with many transverse nerves, and peduncled: the stipules scarcely apparent. The flowers, which appear in June, are of a golden colour, placed upon long pendent terminal spikes.[1] The leaves of the calyx are crenated, blunt, and greenish; the petals unequal, spreading, and waved. The three undermost filaments are long and incurved; the others exhibit large anthers, three of which are rostrated, or like the open beak of a bird, at the extremity. The fruit is a long woody dark-brown pod, about the thickness of the human thumb, and nearly two feet in length, cylindrical, with two longitudinal furrows on one side, and one on the other; and divided into numerous transverse cells, each containing one smooth, oval, yellowish, shining seed, with red lines dividing it longitudinally, imbedded in a soft black pulp.[2]

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[1] Chaiarxambar of the Egyptians. *Prosper Alpinus, de Plantis Ægypti,* cap. ii.

The pods are said to undergo a kind of fermentation, to prepare them for keeping. Those which are brought to this country come principally from the West Indies, packed in casks and cases. The heaviest pods, and those in which the seeds do not rattle on being shaken, are the best, and contain the greatest quantity of pulp, which is the part used.

Qualities. — The pulp has a slight, rather sickly odour, and a sweet mucilaginous taste. It is viscid; almost entirely soluble in water, and partially so in alcohol and sulphuric ether. The watery infusion, which shows a tendency to gelatinize, has, when filtered, a deep brown colour; and yields a precipitate with alcohol, and the solution of the superacetate of lead. The alcoholic and ethereal tinctures are not affected by the addition of water; although, when they are evaporated, a thin pellicle of resin remains. No alteration is produced on the alcoholic and watery infusions by infusion of galls, nitrate of silver, sulphate of iron, nor the nitric nor sulphuric acids; but oxymuriatic acid throws down a yellow-coloured precipitate which is insoluble in ether. Hence there is reason for concluding with Vauquelin, that this pulp contains sugar, gelatin, gluten, mucus, a small portion of resin, extractive, and some colouring matter.

Medical properties and uses. — Cassia pulp is gently laxative; but although it is adapted for children and very delicate women, yet it is apt to induce nausea, flatulence, and griping, when taken in doses sufficient for stronger habits. To assist its operation, and prevent the griping, it is usually conjoined with some neutral salt and an aromatic; but it is now rarely prescribed in any case. The dose is ʒiij to ℥j or more.

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[1] Alpinus says, "Sunt etiam hi valde odorati, præsertimque oriente sole." *Ibid.* l. c.

[2] *Gærtner de Fruct.* i. 313. *t.* 147.

Officinal preparations. *Pulpa Cassiæ fistularis expressa.* E. *Confectio Cassiæ.* L. E. D. *Confectio Sennæ.* L. E. D.

2. CASSIA SENNA.

Officinal. SENNÆ FOLIA. *Lond.* FOLIA CASSIÆ SENNÆ. *Edin.* SENNA; FOLIA. *Dub.* Senna leaves.

Syn. Séné (*F.*) Sennablätter (*G.*) Senna (*I.*) Sena (*G.*) Sená (*Arab.*) Sená Mecci (*H.*)

This species of cassia, which yields the senna of commerce, is an annual plant, a native of Upper Egypt. The best grows in the valley of Basabras, or of Nubia[1]; flowering in July and August. It rises with an erect branching stem about two feet in height. At the base of the leaves, which are pinnate, and placed in alternate order, are two narrow pointed stipules: the leaflets, of which each leaf has five or six pair, are sessile, oblique at the base, oval, pointed, scarcely an inch in length, and one-fourth of an inch broad, and of a yellowish green colour. The flowers are yellow, in loose axillary spikes: the calyx is deciduous, consisting of five narrow obtuse concave leaflets: the petals are roundish, concave, entire; the three lower ones larger than the two upper: the undermost filaments also are longer than the others, and furnished with large rostrated curved anthers; and the germen is long and flat, with a short incurved style terminated by an obtuse stigma. The fruit is an ovate, reniform, membranous, leafy, compressed legume, torose where the seeds are, and marked with capillary, transverse, parallel striæ: bivalve, with six or nine cells, divided by very thin transverse partitions, and each containing one oblong heart-shaped seed.[2]

The best senna, named in Nubia *guebelly*, or *sena mekki*, grows wild, and yields two crops of leaves, the abundance of which depends on the periodical rains. The first crop is collected after the first rains about the middle of September; the second in the following March. The plants are cut when the flowers begin to fall, and exposed on the rocks to dry in the sun. The leaves are then picked, packed up in bales, and sent to Boulac, the great entrepôt of senna, where they are mixed with two other species of cassia; one the *C. senna* of Forskal with obtuse leaves; the other probably the *C. angustifolia* of Willdenow, the leaves of which are longer, narrower, and sharper pointed than those of the proper senna, and come from Mocha; but the leaf with which senna is chiefly adulterated is that of the Cynanchum *Oleafolium*, known in Egypt by the name of Argel or Arguel. The proportions, according to Dr. Calloden are 500 parts lance-leafed senna, 200 of obovate senna, and 200 of argel. The two first are equally good, but the last is truly an adulteration. It can be readily distinguished by attending to the following rules. 1. The leaf of argel is an inch or 14 lines long, while that of senna never exceeds nine lines. 2. The leaf of argel has a straight side; and the lateral nerves not seen on the under disk, while those of senna are conspicuous. 3. The leaf of argel is regular at its base, the two sides terminating at the same point on the petiole: but the senna leaflet is oblique, one of the sides being larger, and produced lower on the petiole than the other.[1] There is also reason for thinking that it is further adulterated with the leaves of *Colutea arborescens*, bladder-senna, and of box: but these are easily distinguished from senna leaves. The senna after being thus mixed, is repacked in bales at Alexandria, whence it is exported to Europe.[2]

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[1] C. Nectoux. Vide *Phil. Mag.* xv. 55.

[2] *Gærtner de Fruct.* ii. 312. *t.* 146.

Qualities.—The odour of senna leaves is faint, rather disagreeable and sickly; the taste slightly bitter, aromatic, sweetish, and nauseous. Boiling water extracts about one-third of the weight of the leaves employed: the infusion has a deep reddish brown colour, with the odour and taste of the leaves. This infusion, when exposed to the atmosphere, deposits a lemon-yellow-coloured insoluble matter; and a precipitate is produced by the strong mineral acids, oxalic acid, the carbonates of the alkalies, and several other substances. (See *Infusum Sennæ*, among the Preparations.) Alcohol and sulphuric ether digested on the powdered leaves acquire a deep olive-green colour. When the ethereal tincture is poured on the surface of pure water, a dark olive pellicle remains after the evaporation of the ether, which is almost insipid, and has all the properties of resin; and a golden yellow colour is communicated to the water.[3] The alcoholic tincture is rendered only slightly milky by the addition of water, and scarcely any precipitate is produced; but a copious one is thrown down by oxymuriatic acid. The active principle of senna appears to be a very oxidizable extractive resin, and a peculiar volatile matter; and it contains also mucus, and some saline ingredients. According to Bouillon Lagrange, the residue of the watery infusion evaporated to dryness, and burnt, yields potass, sulphate of potass, carbonate of lime, magnesia, and silica.

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[1] *Hist. Nat. et Med. des Casses*, &c. Par L. T. Fred. Calloden, de Geneve, M. D. 4to. Planches. Montpelier, 1816.

[2] Nectoux says, The palthier, or senna-manager, of Alexandria acknowledged that the product of the two crops varies from 700 quintals to 1100 or more, one-third of which is *arguel*, the obtuse pointed cassia, and the sale is 1400 or 1500 quintals (more probably from 15 to 1600). *Phil. Mag.* l. c.

[3] This colour may be produced by some extractive being taken up by the ether, closely united to the resin.

Medical properties and uses. — Senna is purgative, generally operating under four hours after it is taken; and is well adapted for all cases in which the bowels require to be certainly, yet moderately evacuated. In many habits it is apt to occasion griping, and therefore requires the addition of some aromatic, as carraway or cardamom seeds, or ginger; and its operation to be assisted by drinking plentifully of weak broths or gruel. The griping seems to be occasioned by the resinous matter, as the infusion made with cold water does not gripe, although it purges. Senna may be given in substance powdered; but the more usual form is that of infusion. Decoction is a bad form, as the activity of the medicine is much impaired by the boiling: owing, according to Gren, to the total dissipation of the nauseous and volatile principles; but, in our opinion, to the oxidizement of the extractive, which also accounts for the severe gripings induced by the decoction. The dose of the powder of the leaves is from ℈j to ʒj; but it is seldom given alone.

Officinal preparations. *Confectio Sennæ.* L. E. D. *Extractum Cassiæ Sennæ.* E. *Infusum Sennæ.* L. D. *Infusum Tamarindi cum Senna.* E. D. *Pulvis Sennæ compositus.* L. *Tinctura Sennæ.* L. E. D. *Syrupus Sennæ.* D.

CASTOR. *Syst. Nat. Gmelin.* 124.

Cl. 1. *Ord.* 4. Mammalia, Glires.

G. 23. *Fore-teeth* in the upper jaw truncated, hollowed with a transverse angle; in the lower transverse at the point. *Grinders* in both jaws four. *Tail* long, depressed, scaly. *Clavicles* perfect.

Species 1. C. *Fiber.* The Castor Beaver. *Jonst. Quadr. p.* 147. *t.* 68.

Officinal. CASTOREUM.[1] *Lond. Edin.* CASTOREUM ROSSICUM et CANADENSE. *Dub.* Castor; Russian and Canadian.

Syn. Castoreum (*F.*) Kastoreum (*G.*) Castoro (*I.*) Castoreo (*S.*) Ash butchegan (*A.*) Gooná beyduster (*Pers.*)

The beaver is an amphibious quadruped, found in the northern parts of Europe, Asia, and America, inhabiting the wooded banks of uninhabited rivers and lakes; in which situations it is gregarious, and constructs its habitation with greater skill than any other animal except man. The body is thick, under three feet in length, and covered with short iron-brown and chesnut-coloured hair: the feet are five-toed and webbed; the eyes small, and the ears short and hairy. The tail is about half the length of the body, flat, horizontal, scaly, with that part only of it that is next to the body covered with hairs. Between the anus and the external genitals are four follicles of an oblong shape, smaller above and larger below; the two upper are filled with a fatty substance, whilst the two larger contain each about two ounces of an oily viscid strong-smelling substance, inclosed in membranous cells, which is the officinal castor.

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[1] Καςος Dioscoridis. The ancients erroneously believed that the castor follicles were the testicles of the Beaver.

When the beaver is taken, the follicles are cut off entire, and dried either by exposure to the sun, or in smoke. The castor is at first fluid, but gradually becomes solid and viscid, occasionally perfectly dry and pulverulent. The best comes from Russia; but of late years it has been very scarce, and all that is now found in the shops is the produce of Canada. The cods of the Russian castor are large, dry, roundish, heavy, and solid, appearing, when cut, of a reddish liver colour; those of the Canadian are smaller, hard, oblong, thin, and corrugated on the outside. In each beaver there is a large and small bag; and the castor in the larger bag is always the best. The goodness of the castor is determined by its sensible qualities; that which is quite black, insipid, inodorous, and oily, being unfit for use. Castor is said to be sometimes counterfeited by a mixture of some gummy and resinous substances, with a little real castor, artificially interspersed with membranes, and stuffed into the scrotum of the goat.[1] The fraud is easily detected by comparing the smell and taste with those of real castor; and by the deficiency of the sebaceous follicles which are always attached to the real cods.

Qualities. — The odour of castor is strong, heavy, and aromatic; the taste bitter, sub-acrid, and nauseous. It feels slightly unctuous, and is of a red-brown colour. Its odorous principle is dissipated by coction with water; but when it is simply infused in boiling water, its sensible qualities are in a small degree imparted to the infusion, which has a yellow colour, and shows the presence of an alkali, by changing to green the vegetable blues. Alcohol and sulphuric ether dissolve the resinous part of the castor, which remains after the evaporation of the menstrua, and retains all the odour and taste of the drug. According to the analysis of Bouillon Lagrange, castor contains the carbonates of potash, lime, and ammonia, iron, resin, a mucilaginous extractive matter, and a volatile oil. Canadian castor contains benzoic acid, both free and combined.[2]

Medical properties and uses. — Castor is antispasmodic, and emmenagogue. It is given, with seeming advantage, in low nervous fevers, hysteria, epilepsy, and spasmodic affections: and from the idea of its action being particularly determined to the uterine system, it is supposed to prove useful in amenorrhœa and chlorosis. It may be exhibited either in powder, or in the form of tincture; but owing to the scarcity and the high price of good castor, it is seldom ordered; and the materia medica certainly contains many better antispasmodics.

The dose of powdered castor is grs. x. to ℈j, given as a bolus.

Officinal preparation. *Tinctura Castorei.* L. E. D.

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[1] *Duncan's New Edinburgh Dispensatory*, 5th edit. 220.

[2] Laugier. *Ann. de Mus. d'Hist. Nat.* t. 9. p. 323.

CENTAURIA. *Spec. Plant. Willd.* iii. 2277.

Cl. 19. *Ord.* 3. Syngenesia Frustranea. *Nat. ord.* Compositæ Capitatæ *Linn.* Cinarocephalæ *Juss.*

G. 1548. *Receptacle* bristly. *Seed-down* simple. *Corolla* of the ray funnel-shaped, longer, irregular.

* * * * * Calcitrapæ; *with the spines of the calyx compound.*

Spec. 89. C. *benedicta.* Blessed Thistle. *Med. Bot. 2d edit.* 34. *t.* 14.

Officinal. CENTAURIÆ BENEDICTÆ HERBA. *Edin.* CARDUUS BENEDICTUS, FOLIA. *Dub.* The herbaceous part, or the leaves of Blessed Thistle.

Syn. Chardon benit (*F.*) Kardo benediktenkract (*G.*) Curdo santo (*I.*) Curdo bendito (*S.*)

This is an annual plant, a native of Spain and the Grecian islands, flowering in June and September: and cultivated in the gardens of this country, where it thrives as well as in its native soil.[1] The root is whitish, cylindrical, and branched, the stem erect, roundish, channelled, and rough, about two feet in height, and branched towards the top. The lower leaves are peduncled, but the upper sessile, and in some degree decurrent; the whole are long, elliptical, rough, runcinate, and barbed with sharp points; of a bright green colour above, whitish underneath, and reticulated. The flowers are surrounded by an involucre of ten leaves, the five exterior of which are larger: the calyx is oval and woolly, and each scale terminated by pinnate spinous points: the florets are of a yellow colour, those of the ray small, trifid, and sterile. The seeds have a paleaceous receptacle, are brown, pyriform, a little curved, deeply striated, and crowned with a double pappus, the outer one calyculate, the inner spinous.[2]

This plant is in greatest perfection when in flower, at which time it should be cut, quickly dried, and preserved in a dry airy place.

Qualities.—The odour is weak, yet unpleasant; the taste intensely bitter, but not very permanent. Its virtues are extracted both by water and alcohol, The watery infusion has a pale greenish-yellow colour, which is changed to a deep olive by sulphate of iron, and an orange-brown by the pure alkalies, although the carbonates do not affect it. Nitrate of silver and superacetate of lead occasion copious precipitates, and are therefore incompatible with this infusion.

Medical properties and uses.—Carduus benedictus is emetic, diaphoretic, or tonic, according to the form and strength of the preparation in which it is administered. The decoction and strong infusion provoke vomiting; the less strong warm infusion determines powerfully to the surface, occasioning a copious flow of sweat; and the light infusion, made with six drachms of the leaves and one pint of cold water, is an elegant and efficacious bitter in loss of appetite, and the dyspepsia which is occasioned by irregularities. It was formerly supposed to possess such extraordinary medicinal powers as to deserve the appellation *benedictus;* but it is seldom used in modern practice. The dose of the powdered herb is grs. xv. to ʒj; that of the infusion f℥ij given every three hours.

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[1] It was described as being cultivated in England by Gerarde in 1597.

[2] *Gœrtner de Fruct.* ii. 385. *t.* 162.

CENTAURII CACUMINA. Vide *Chironia Centaurium.*

CEPHAELIS. *Spec. Plant. Willd.* i. 977.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Aggregatæ *Linn.*

G. 357. *Flowers* in an involucred head. *Corolla* tubular. *Stigma* two-parted. *Berry* two-seeded. *Receptacle* chaffy.

Species nova. Cephaëlis vel Callicocca *Ipecacuanha.*[1] Ipecacuan *Linn. Soc. Trans.* vi. *p.* 137. *t.* 2.

Officinal. IPECACUANHÆ RADIX. *Lond. Edin. Dub.* The root of Ipecacuan.

Syn. Ipecacuanha (*F.*) Brechwurzel, (*G.*) Ipecacuana, (*I.*) Ipecacuanha, (*S.*)

This plant is a perennial, found growing in shadowy moist situations in the forests of the provinces of Pernambuqua, Bahia Rio Janeirio, Paulensia, Mariannia, and other provinces of the Brasils; flowering in December, January, February, and March; and ripening its berries in May. The root is simple, or somewhat branched, and furnished here and there with short radicles; it is roundish, three or four inches in length, and two or three lines in thickness; bent in different directions, externally brown, and annulated with prominent, unequal roughish rings. The stem is procumbent at the base, rising from five to nine inches in height, round, the thickness of a hen's quill; smooth, brown, leafless, and knotted in the lower part, but leafy towards the apex: after the first year it throws out runners, from which, about six inches apart, new erect stems arise. The inferior leaves are caducous, so that not more than eight generally remain at the summit of each stem when it flowers: they are almost sessile, opposite, spreading, ovate, pointed at both ends, three or four inches long, and less than two broad; of a deep green colour on the upper surface, and of a whitish green, downy, and veined on the under. At the base of each pair of leaves are sessile, fimbriated, short, withering stipules embracing the stem. The flowers are aggregated in a solitary head, on a round, downy footstalk, terminating the stem, and encompassed by a four-leaved involucre. The florets are sessile, from 15 to 24 in number, interspersed with little bractes: the calyx, is very small, five-toothed, superior, and persistent; the corolla monopetalous, the expansion shorter than the tube, and divided into five ovate, acute, recurved segments: the filaments are short, capillary, inserted into the upper part of the tube, and bearing long erect anthers: the germen inferior, supporting a filiform style, with two obtuse stigmas the length of the anthers; becoming a soft one-celled berry, of a reddish-purple colour changing to black, and containing two oval seeds.

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[1] As Willdenow, following Swartz, has united the genus Callicocca with that of Cephaëlis, we have referred the Ipecacuanha to this genus.

According to Decandolle, the term ipecacuanha in South America implies generally *vomiting root*; and therefore it is applied to the roots of very different species of plants. The plant, however, which we have described from professor Brotero's description published in the sixth volume of the Linnean Transactions, and the Psycotria *emetica* which Mutis says yields the Peruvian gray ipecacuan are the plants that yield the varieties of the root brought to this country.[1] We have found very little of the white ipecacuan in any of the specimens of the ipecacuan of the shops which we have examined. Both the gray and the brown varieties of the root are brought to this country packed in bales from Rio Janeirio. Both are in short, wrinkled, variously bent and contorted pieces which break with a resinous fracture. The gray is about the thickness of a small quill, full of knots and deep circular fissures, that nearly reach down to a white woody fibre that runs through the heart of each piece; the external part is compact, brittle, and looks smooth: the brown is smaller, more wrinkled, of a blackish brown colour on the outside, and white within: the white is woody, and has no wrinkles.

In choosing ipecacuanha, the larger roots, which are compact, and break with a resinous fracture, having a whitish gray somewhat semitransparent appearance in the inside of the cortical part, with a pale straw-coloured medullary fibre, are to be preferred.

It is impossible to ascertain at what period the effects of this root were first known in America, where the Indians used it as an emetic before their connexion with Europeans: but although Piso described its uses fully in his Natural History of Brazil so early as 1618, and brought the root to Europe, yet it was scarcely used by Europeans before the year 1700. It was carried to France by a French physician of the name of Le Gras in 1672; but it did not attract general notice until it was a third time introduced by a French merchant of the name of Grenier, who brought 150 lbs of it from Spain in 1686, with which trials were made at the Hotel Dieu. Helvetius first made known its use in dysentery, and was rewarded by Louis XIV. with 1000*l.* sterling for the discovery.

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[1] The title of ipecacuan is generally given to the roots of the following plants, besides those mentioned above, in South America: Viola *parviflora*, V. *Ipecacuanha*, V. *Calcealaria*, Cynanchum *Ipecacuanha*, C. *tomentosum*, and Asclepias *currassavica*; and sometimes to Euphorbia *Ipecacuanha*, Dorstenia *brasiliensis*, and D. *arifolia*. In St. Domingo several species of Ruellia, which provoke vomiting, are named false Ipecacuan. *Nouveau Dictionaire d'Histoire Naturelle*, art. *Ipecacuanha*.

Qualities. — The entire root is inodorous, but the powder has a faint disagreeable odour. The taste is bitter, subacrid, and extremely nauseous. Various analyses of ipecacuanha have been made in order to detect its emetic principle, but the most satisfactory is that of M. M. Majendie and Pelletier.[1] After digesting the powdered root in ether, the remainder was treated with highly rectified alcohol, until it ceased to become coloured even when aided by heat. These tinctures after being allowed to cool, and to deposit some flakes of wax which were separated by filtration, were then evaporated to dryness, and the residue re-dissolved in water; and acetate of lead being added to the watery infusion, a precipitate formed, which when edulcorated and diffused through water was exposed to a current of sulphuretted hydrogen gas, to separate the lead; after which the liquid being filtered and evaporated to dryness afforded a substance of a peculiar nature, on which it was experimentally demonstrated that the emetic properties of the root depend. *Emetin*,[2] the name given to this substance, when thus obtained, is in the form of brownish red scales, which are nearly inodorous, and have a slightly bitter, acrid, but not nauseous taste. When exposed to a heat stronger than that of boiling water, it is decomposed, furnishing water, carbonic acid, some oil, and acetic acid, charcoal being left. It is soluble in water in all proportions without undergoing any alteration, and deliquesces in a moist atmosphere. It is also soluble in alcohol, but not in ether. To detail the action of other chemical agents on this body is here unnecessary; the results are sufficient to characterize it as a substance sui generis.

The medicinal value of ipecacuanha depends, undoubtedly, on the quantity of emetin it contains; and this varies in the three varieties of the root found in the shops. M. M. Majendie and Pelletier obtained 16 parts of it in 100 of the cortical part of brown ipecacuanha, the root of the Psycotria *emetica* of Mutis,[3] 14 in 100 of the grey ipecacuanha, the root of the Callicocca *ipecacuanha*[4] and 5 only in 100 of the white ipecacuanha, the root of the Viola *emetica.*[5] The woody pith even of the brown variety contains very little emetin, and hence it should be separated in reducing the root to the form of powder.

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[1] Vide *Ann. de Chim. et de Phys.* iv. 172. and *Lon. Med. Repository*, viii. p. 252.

[2] The name is derived from *εμεω* vomo.

[3] The components procured from 100 parts of brown ipecacuanha were as follows; of fatty and oily matter 2; emetic matter (emetin) 16; wax 6; gum 10; starch 42, and ligneous matter 20; the remaining 4 parts being regarded as loss.

[4] 100 parts of the grey variety yielded, of fatty matter 2; emetin 14; gum 16; starch 18; woody matter 48; with merely a trace of wax, and 2 of loss.

[5] From 100 parts of the white ipecacuanha, were obtained of emetin 5; gum 35 vegeto-animal matter 1; and woody matter 57; besides 3 of loss.

Experiments made with emetin on animals, prove that it is emetic and purgative, in doses of half a grain, and exerts a specific action on the lungs and mucous membrane of the intestinal canal, and has also marked narcotic properties: that it may be employed instead of ipecacuanha in every case in which this medicine is useful, the dose being more easily regulated, and the effects more certain. When taken in an over-dose, its action can be instantly paralysed by decoction of galls. These experiments are at variance with those of Dr. Irvine, which led him to conclude that the watery solution of ipecacuan is more emetic than the alcoholic, the reverse being found to be the case.

The powder is apt to become inert by keeping; and therefore it should be preserved in small phials, well corked, and not exposed to the light. Long-continued boiling also renders it inert.

Medical properties and uses.— Ipecacuanha, when administered in large doses is emetic; in smaller ones diaphoretic and expectorant; and in still smaller doses it acts as a stomachic, stimulating and giving energy to the digestive organs. As an emetic, it is mild, safe, and certain in its operation; but it is a mistake, that when given in larger doses than are necessary it does not operate more violently, but only in a shorter space of time. It does not act so quickly as many other emetic substances; but it evacuates completely the contents of the stomach, and does not so much weaken it as antimonial emetics. It is given at the commencement of continued fevers, the progress of which is sometimes cut short by its operation; and it is also frequently found to stop the paroxysm of an intermittent, when given immediately before the accession of the cold stage. At the commencement of inflammation of the pharynx, larynx, and trachea, when the inflammation does not run very high; in cynanche tonsillaris; and every case in which it is necessary to evacuate the stomach, ipecacuan has been found useful. As an emetic, however, it is contra-indicated when there is any reason for suspecting inflammation of the encephalon, passive hæmorrhagy, or hernia; and in the advanced stage of typhus fevers, when the pulse is feeble, and the strength much diminished; but in these instances all emetics are hurtful. In doses sufficient to excite nausea without producing vomiting, ipecacuan is given with excellent effects in dysentery[1], and obstinate diarrhœa: in which cases its efficacy seems to arise in a great degree from the nausea, which is kept up by the repetition of the small doses diminishing the arterial excitement, and determining to the surface; and partly also, as Cullen supposed, from its producing a steady determination of the peristaltic motion of the intestines downwards.[1] Perhaps also to these first-mentioned effects of the nausea, may be attributed much of the benefit which results from the use of ipecacuan in spasmodic asthma, dyspnœa, pertussis and epilepsy. In the first of these diseases its emetic power is taken advantage of to relieve the paroxysm, after which it is given in repeated small doses to prevent its return.[2] In nauseating doses also, owing to the nausea lessening the force of the circulation, it has been employed with the best success in uterine and pulmonary hæmorrhages. As a sudorific, it is used in acute rheumatism, arthritic affections, dropsy, and other diseases in which sweating is necessary. It is generally given in these cases in combination with opium and neutral salts, according to the mode introduced by *Dover*; (see *Pulvis Ipecacuanhæ compositus.*) But we have found it in combination with opium alone in a larger proportion, more efficacious, particularly in rheumatism. Its expectorant powers have been found exceedingly useful in catarrhal affections, pneumonia after bleeding, and in the early stage of phthisis, in which its diaphoretic effect is also beneficial.

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[1] *Piso, Helvetius, Cleghorn, Pringle.*

The emetic operation of ipecacuan is quickened by combining it with tartarized antimony: and, on the contrary, it is counteracted by opium, and vegetable acids. Opium, however, is rendered less narcotic when combined with ipecacuan, although its power of allaying pain is not diminished, while the sudorific effect of the ipecacuan is much augmented by the combination. We do not, however, agree in opinion with those who think it is to be relied upon as an antidote against the deleterious effects of opium; its emetic effect being too slow, and checked by the opium.

Ipecacuan is exhibited in substance, and in aqueous and vinous infusions: and on the continent a syrup of it is used for children.[3] The dose of the powder, to produce full vomiting, is from grs. xv. to ʒſs; and of the aqueous infusion, which is made by macerating for an hour ʒij of the powdered root in f℥vj of boiling water, and filtering, f℥j or f℥jſs may be given every half-hour till it excites vomiting. The emetic effect is continued, and rendered easier to the patient, by drinking, in the intervals of vomiting, large draughts of tepid water. For producing the other effects of ipecacuan, it is given in doses of one, two, or three grains, generally in the form of pills; and repeated every four or five hours: but although its sudorific effect, when begun, is aided and kept up by the use of warm fluids, yet these must not be drunk soon after the dose has been taken.

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[1] *Materia Med.* ii. 477.

[2] *Akenside.*

[3] The following is the mode of preparing the syrup. Take oz. vj of ipecacuan in fine powder, and pour over it lbs. vj. of cold water, and after twenty-four hours decant it off; then add lbs. vj more of water; and again lbs vj more a third time, proceeding always as at first. Mix the decanted liquors, and filter; and then with a moderate heat dissolve in them lbs. xij of refined sugar. One ounce is equivalent to twelve grains of the powder. *Annales de Chimie*, xlvi. 33.

Officinal preparations. *Pulvis Ipecacuanhæ compositus.* L. D. *Vinum Ipecacuanhæ.* L. E. D.

CERA. Wax.

Syn. Cire (*F.*) Wachs (*G.*) Cera (*I.*) Cera (*S.*) Shuma (*Arab.*) Mom (*H.*) Medhúchhishta (*San.*)

Bees, as the experiments of Huber have proved[1], produce the wax of which the delicate partitions of the cells of their combs are constructed, from honey, sugar, and the sweet secreted juice found in the nectaries of plants; but they do not collect it ready formed from the anthers of flowers, as has been generally supposed. It is, nevertheless, also produced as a secretion by many plants, forming the silvery powder or bloom, which often covers their leaves and fruit; and is found in great abundance combined with resin, covering the trunk of the wax-palm (*Ceroxylon*) of South America[2], and very pure, encrusting the seeds of the Myrica *cerifera*, or wax-tree of Louisiana and other parts of North America.[3] Hence wax, in the extended meaning of the term, may be regarded both as an animal and a vegetable product. But it is the former species only of it, or bees' wax, which is officinal, and demands our present consideration. It is admitted into the list of materia medica under two forms: — 1st. As it is procured originally from the combs, combined with colouring matter, or unbleached; and 2d, Deprived of colour, and purified or bleached.

1. UNBLEACHED WAX.

Officinal. CERA FLAVA. *Lond. Edin. Dub.* Yellow Wax.

Syn. Cire jaune (*F.*) Wachs (*G.*) Cera gialla (*I.*) Cera qualda (*S.*) Munjie Moolakhoo (*Tam.*)

Yellow wax is prepared immediately from the honeycomb. The honey is obtained by dripping and pressing the comb, which is then soaked for some days in clear water, to extract all the remaining honey; and afterwards melted in a clean vessel with boiling water, and pressed through cloth bags. It is then re-melted and cast into round cakes, in which form it is brought to market.[4]

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[1] *Nicholson's Journal*, ii. 182.

[2] This palm is found in the Quindin mountains only, rising 180 feet in height, and having leaves 20 feet long. The waxy secretion covers the trunk to the thickness of about two inches; and consists of two-thirds of resin and one of wax. *Humboldt Plantæ Æquinoctiales*, &c. fasc. i.

[3] The *pe la* of the Chinese is an animal wax; and the *white lac* of India appears also to be a variety of wax.

[4] Large quantities of wax are imported from the Baltic, the Levant, and the Barbary coast.

Qualities. — Good and recent yellow wax has a slight odour of honey, is insipid, and of a bright pale yellow hue. It is brittle, yet soft; somewhat unctuous to the touch, but without adhering to the fingers, or to the teeth when it is chewed; acquires tenacity when heated; melts at 142°, and burns entirely away. Its specific gravity varies from 0.9600 to 0.9650.

Wax in this form is often adulterated with earth, pease meal, or resin and tallow. Earth, or pea's meal, may be suspected, when the cake is very brittle, and the colour inclines more to gray than bright pale yellow: they may be separated by remelting and straining the wax. The presence of resin may be suspected when the fracture appears smooth and shining, instead of being granulated; and it may be detected by putting small pieces of the wax in cold alcohol, which will readily dissolve the resinous part, without sensibly acting on the real wax. Tallow is discovered by the greater softness and unctuosity of the cake, and its disagreeable suffocating smell when melted.

Medical properties and uses. — Yellow wax is scarcely ever ordered for internal use, although its colouring matter does not affect its medical properties. It is chiefly employed in the composition of external applications.

Offi. prepar. *Cera flava purificata.* D. *Emplastrum Ceræ.* L. E.

2. BLEACHED WAX.

Officinal. CERA ALBA. *Lond. Edin. Dub.* White Wax.

Syn. Cire blanche (*F.*) Cera bianca (*I.*) Cera blanca (*S.*) Vultay Moolakhoo (*Tam.*)

When yellow wax is exposed, with an extended surface, to the action of light and air, and sprinkled with water, the yellow colour and peculiar odour are lost, and it becomes white. This process is thus performed: — The yellow wax is melted with a very little water in a copper vessel, and then run off, through a plug-hole in the bottom, into another vessel, which is covered with a cloth to retain the heat until the water and the impurities settle. The clarified melted wax is next suffered to flow into a vessel, the bottom of which is full of small holes, through which it runs in small streams upon a cylinder kept constantly revolving over, and partly dipping in, cold water, into which the wax falls drawn out into thin shreds or ribbands, and is instantly cooled. These are spread upon cloths stretched on frames exposed to the light and air, and occasionally watered and turned; so that after some days the colour nearly disappears. After being thus half-bleached, the wax remains heaped up in a solid mass for a month, when the whole process is again repeated. It is, lastly, generally melted and cast into thin discs about five inches in diameter, in which form it is found in the shops.

White wax is sometimes adulterated with white oxide of lead, in order to increase its weight; and with white tallow. The former is detected by melting the wax in water, when the oxide falls to the bottom of the vessel; and white wax is known to contain tallow when it is of a dull opaque white, and wants the translucency which distinguishes pure wax.

Qualities. — Pure white wax is perfectly insipid, inodorous, and somewhat translucent. It is harder, less unctuous to the touch, heavier, and less fusible than yellow wax; its specific gravity being from 0.8203 to 0.9662; and its melting point 155°. It melts into a colourless transparent fluid, which concretes again as it cools, resuming its former appearance. Wax is perfectly insoluble in water, and nearly so in cold alcohol and ether, although these latter fluids take up about one-twentieth of their weight at a boiling temperature, which is again deposited as the fluids cool. It dissolves in the fixed oils, forming the base of cerates and ointments; and unites in some degree when boiled with alkalies, forming soaps. The acids at an ordinary temperature scarcely affect it; but when the sulphuric is boiled on it, a thick blackish mass is produced. The products of its decomposition by heat, in close vessels, show that, like the fixed oils, it is a triple compound of carbon, hydrogen, and oxygen, in unknown proportions.

Medical properties and uses. — Wax is regarded as a demulcent; and is sometimes exhibited in obstinate cases of diarrhœa and dysentery, with the view of sheathing the bowels; but its place may be better supplied by simple mucilages and gelatinous solutions. It is generally exhibited diffused in mucilaginous fluids by means of soap, in the proportion of one-third part of the wax, with which it is first melted, and then rubbed in a mortar with the fluid, which is gradually added: but Poerner's method, which is, first to melt the wax with olive oil, and then mix the oily compound while hot with the mucilaginous fluid, by triturating with the yolk of an egg, is a preferable one. The dose is a cupful of the emulsion, containing about ℈j of wax, given every four or five hours.

CERVUS. *Syst. Nat. Gmelin.* 175.
Cl. 1. *Ord.* 5. Mammalia Pecora.
G. 29. *Horns* solid; when tender covered with a velvety coat, and growing at the apex; shed annually; forked. *Fore-teeth* 8 in the lower jaw. *Tearing teeth* none (sometimes solitary in the upper jaw.)
Sp. 1. C. *Elaphus.*[1] The Stag, or Hart. *Johnst. Quadr.* 82. *t.* 32, 35.
Officinal. CORNUA. *Lond.* CERVI ELAPHI CORNU. *Edin.* CORNU CERVINUM. *Dub.* Harts' Horns.
Syn. Corne de Cerf (*F.*) Hirschorn (*G.*) Corno di Cervo (*I.*) Cuerno de Ciervo (*S.*)

The stag, of which there are three known varieties, is a native of almost every part of Europe, and of the northern parts of

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[1] Ελαφος. *Aristot. Hist. Animal.* ii. c. 7. 18.

America and Asia. In Britain its numbers have been much reduced by the progress of civilization; but it is still found wild in the highlands of Scotland; the moors bordering on Devonshire and Cornwall; and on the Kerry mountains in Ireland. It is a very beautiful animal, about three feet and a half in height, of a rust-brown colour on the upper part of the body, and whitish below. The horns are annually shed, about the end of February and March; but are soon reproduced in a soft, tender state, full of blood-vessels, and covered with a velvety skin, which is lost as they increase in size; and at length, about the month of July, they become hard, compact, and bony. They have no horns till they are above a year old, and these do not branch till the third year; after which the branches increase in number every year, so that the age of the animal may in some degree be determined by them.[1]

These horns differ from those of most other animals, and approach nearer to the nature of bone, containing only less of the phosphate of lime in their composition, and yielding a much larger proportion of gelatine. It is for the sake of the gelatine that their shavings are medicinally used. These are often adulterated with shavings of mutton bones, which, however, are easily detected by their greater degree of brittleness.

Qualities. — Hartshorn shavings when good are inodorous and insipid, pliant, of an ivory-yellow colour; and contain 27 parts of gelatine in 100 parts.[2] Four ounces of them boiled in two pints of water until one pint be dissipated, and the remainder strained, afford, when the decoction cools, a clear, transparent, colourless, insipid, inodorous jelly, which is a compound of gelatine and water.

Medical properties and uses. — The gelatine yielded by stags' horns is considered as a demulcent; but its nutrient properties are more useful than its medicinal virtues. It forms, when united with orange-juice, sugar, and a little wine, a good article of diet for the sick and convalescent; and, when mixed with an equal portion of cows' milk, it is very useful in the irritations of infants arising from acidities in the primæ viæ.

Officinal preparations. *Cornu ustum.* L. D. *Liquor vol. Cornu cervini.* D. *Oleum Cornu cervini rectif.* D.

CEREVISIÆ FERMENTUM. *Lond. Edin.* Yeast.

Syn. Leveure (*F.*) Güscht (*G.*) Fermento di cervogia (*I.*) Espuma de cerbeza (*S.*)

This substance is the scum or frothy matter which collects on the surface of beer while fermenting. It has been chemically examined by Westrumb, who obtained from it a variety of ingredients[1]; but its essential constituent, or fermenting principle, is supposed to be gluten, or something very analogous to that vegetable principle. Its medical properties may perhaps be attributed to its containing the bitter of the hop, some ready-formed alcohol, and carbonic acid.

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[1] The castrated fawn never gets horns at any period of its life.

[2] *Annales de Chimie*, xxxiv. 71.

Qualities.—Yeast has a vinous, sour odour; a bitter taste; and reddens the vegetable blues. When it is filtered, a matter remains on the filter which possesses properties similar to those of vegetable gluten; and by this separation the yeast loses the property of exciting fermentation, but recovers it again when the gluten is added. The addition of yeast to any vegetable substance containing saccharine matter excites fermentation in it, and carbonic acid gas is evolved.

Medical properties and uses.—Yeast is tonic and antiseptic. Some years ago it was given with seeming advantage in typhoid fevers attended with symptoms of putridity; but the facts brought forward in support of its efficacy require further confirmation.[2] As an external application, however, to foul and sphacelating ulcers, when united with farinaceous matters in the form of cataplasm or poultice, it is productive of the best effects. It corrects the fœtor of the discharge, assists sloughing, and promotes the formation of a benign and healthy pus.

The dose of yeast is a table spoonful or two, (about f℥ſs) repeated every second or third hour. It is generally combined with porter, or wine, and sugar.

Officinal preparation. *Cataplasma Fermenti.* L.

CETACEUM. Vide *Physeter macrocephalus.*

CHIRONEA. *Spec. Plant. Willd.* i. 1065.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Rotaceæ *Linn.* Gentianæ *Juss.*

G. 349. *Cor.* wheel-shaped. *Pistil* declined. *Stam.* seated on the tube of the corolla. *Anthers* spiral at the end. *Pericarp* two-celled.

Species 9. C. *Centaurium.*[3] Common Centaury. *Med. Bot. 2d. ed.* 275. *t.* 96. *Smith. Flor. Brit.* 257. *Eng. Bot. t.* 417.

Officinal. CENTAURII CACUMINA. *Lond.* CHIRONEÆ CENTAURII SUMMITATES. *Edin.* CENTAURIUM MINUS; CACUMINA FLORENTIA. *Dub.* The flowering tops of Common Centaury.

Syn. Petite Centaurée (*F.*) Tansendgüldenkraut (*G.*) Centaúra (*I.*) Gentiana Centaura (*S.*)

This is an indigenous annual plant, growing in dry gravelly pastures, and flowering in July and August. The root is small, woody, and branching: the stalk, which rises about a foot in height, is erect, smooth, and quadrangular; divided above into

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[1] From 15,142 parts of yeast he obtained the following substances: potash 13, carbonic acid 15, acetic acid 10, malic acid 45, lime 69, alcohol 240, extractive 120, mucilage 240, saccharine matter 315, gluten 480, and water 13,595 parts; besides some traces of phosphoric acid and of silica. *Crell's Annals,* 1796, and *Thomson's Chem.* 4th edit. v. 406.

[2] It was suggested as a remedy in these complaints by the Rev. Mr. Cartwright.

[3] Named, according to Pliny, κενταυριον from Chiron the Centaur. l. 2.5 c. 6.

a dichotomous panicle, and branched at the base. The leaves are opposite, sessile, elliptical, three-nerved and smooth: the flowers terminal, sessile, and erect, expanding only in the sunshine: the calyx is half the length of the tube of the corolla, five-cleft, with the segments subulate and erect; the corolla is pink, or rose-coloured, divided at the limb into five elliptical equal segments, spreading, and somewhat concave. The filaments are bent down, and furnished with oblong, yellow, three-times twisted anthers; the germen is oblong, bearing a simple style, with a clubbed stigma.

Qualities.—Common centaury is almost inodorous; but the petals, leaves, and stalk have an intensely bitter taste. Both water and alcohol in sufficient quantity extract the whole of its active principles, leaving the insoluble part perfectly insipid. It appears to contain a bitter resin and mucus.

Medical properties and uses.—Common centaury is tonic and antiseptic. Before the discovery of cinchona it was much used for the cure of fevers, and was one of the ingredients of the celebrated Portland powder.[1] It is a useful bitter and tonic; and may well supply the place of some of the more expensive remedies of this description in dyspeptic complaints. The dose of the powder is from ʒſs to ʒj; and of an infusion, made by macerating ℥vj of the dried tops in Oss of boiling water, and straining, f℥jſs to f℥ij, three or four times a day.

CINCHONA.[2] *Spec. Plant. Willd.* i. 957.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Contortæ. *Linn.* Rubiaceæ *Juss.*

G. 346. *Corolla* funnel-shaped. *Capsule* inferior, two-celled, bipartite with a parallel partition. *Seed* winged.

* *Flowers downy, with the stamens included.*

Species 1. C. *Lancifolia, Mutis. Papel Periodici de Santa Fé.* 1792. *Rhode. Monog. Cinchonæ Generis Tentamen*, p. 513. *Zea, Annales de Historia Natural*, tom. ii. p. 207.[3] *Flora. Peruv.* tom. ii. p. 50.

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[1] It is amusing to observe the fate of the various specifics for gout, which have each held for a time its sway over the public opinion; and it is not at all wonderful, that the *eau medicinale*, which has been performing such wonders, is, in its turn, sinking into the same state of neglect as its predecessors. The following were the ingredients of the Portland powder: equal quantities by weight of the roots of birthwort (*Aristolochia rotunda*) and of gentian; the tops and leaves of germander (*Chamædrys*), ground pine (*Chamæpitys*), and lesser centaury (*Chironea Centaurium*), powdered and mixed together. Regarding its effects, Heberden says, "Dum fama ejus vigeret, in tot ægris, qui eo usi sunt, podagra vel mitior facta est, vel rarius repetit, ut vix possit dubitari hos effectus isti medicamento esse tribuendos. Quod autem ulla mala ex illo orta sint, præter fastidium, quod modus nimius attulit, mihi quidem nec certum unquam visum est, nec verisimile." *Comment. de Morborum Hist.* 50.

[2] Named after the Countess del Cinchon, wife of a viceroy of Peru, whom an Indian of Loxa cured of an intermittent, by its means, in 1638.

[3] Zea adds the following synonymes: *Quinquina.* Condam. A. A. Paris, 1738. C. *officinalis.* Linn. Syst. Veg. ed. 10. p. 929. Spec. Plant. p. 244. Gen. Plant. ed. [illegible]. p. 91. C. *officinalis.* Vhal. Act. Soc. Nat. Haum. 1. fasc. p. 17. t. 1. C. *nitida.* Flora Peruv. et Chil. ii. p. 30. t. 191; and *Ruiz.* Quinologia, 56. C. *lanceolata.*

t. 191. *Humboldt. Plantæ æquinoctiales*, p. 33. t. 10. *Lambert's Description of the Genus Cinchona*, plate 1.

Species 2. C. *Oblongifolia, Mutis. Per. de Santa Fé. Zea.* l. c. ii. 211. C. *Magnifolia*, C. *lutescens. Flor. Peruv.* ii. 53. *t.* 196. *Quinologia, art.* vi. 71.

Species 3. C. *Cordifolia. Mutis, Per. de Santa Fé. Zea.* l. c. ii. 214. C. *purpurea. Flor. Peruv.* 32. *t.* 193. C. *ovata. Ruiz. Quinologia.* C. *micrantha. Flor. Peruv.* 52. *t.* 194. *Lambert*, p. 21. plate 2.[1]

This important genus is not yet altogether freed from the ambiguity which has so long involved it; and although much has been effected by the industry of the Spanish botanists whom their Government sent out to make enquiries concerning it, yet many species remain undescribed[2], from which it is very probable the bark gatherers collect some part of the large cargoes which are annually sent to Europe.[3] The three kinds medicinally used have been distinguished and named as above by Mutis, a celebrated botanist, who has resided in the neighbourhood of Santa Fé de Bogota since 1783, as director of the exportation of bark; and his observations have been fully detailed by his pupil Zea; whilst the travels of Humboldt and Bonpland have afforded them an opportunity of ascertaining accurately, and describing, the species first delineated by Condamine, and named by Linnæus *officinalis*, under which term no less than four distinct species were confounded by that distinguished naturalist in the different editions of his System. Under this trivial name also the British pharmacopœias placed as varieties the three barks known in the shops; and this error is still retained by the Dublin college; but in the last editions of their Pharmacopœias the London and the Edinburgh colleges have adopted the trivial name of Mutis; under which we shall describe them.

1. CINCHONA LANCIFOLIA. *Mutis.*

Officinal. CINCHONÆ LANCIFOLIÆ CORTEX. *Lond. Edin.* CORTEX PERUVIANUS. *Dub.* Lance-leaved Cinchona. The *yellow* Bark of the shops.[4]

Syn. Quinquina orange (*F.*) Gelbe Chinarinde (*G.*) China (*I.*) Quina Naranjada (*S.*)

Flora Peruv. 51. C. *glabra. Ruiz.* Quinol. art. 4. 64. C. *rosea.* Flora Peruv. 54. C. *fusca. Ruiz.* Quinol. art. 8. 77.

[1] Besides these synonimes, Zea adds, C. *officinalis, Linn. Suppl.* p. 144. *s, v. edit. Peersoon*, p. 222. C. *pubescens. Act. Haum.* 1 *fasc.* p. 17. *t.* 2.

[2] In a large collection of dried specimens of the genus Cinchona in my possession, which were collected in 1805, both near Loxa and Santa Fé, I find many species which are not mentioned in the works of any of the Spanish botanists.

[3] Humboldt informs us that the quantity of cinchona bark annually exported from America is 12,000 or 14,000 quintals. The kingdom of Santa Fé furnishes 2000 of these, which are sent from Carthagena: 110 are furnished by Loxa; and the provinces of Huamanga, Cuenca, and Jean de Bracamorris, with the thick forests of Guacabamba and Ayavaca, furnish the rest, which is shipped from Lima, Guayaquil, Payta, and other ports on the South Sea. *Plantæ Equinoc.* p. 34.

[4] In stating this as the species which yields the true *yellow* bark, we have followed the authority of Mutis and Zea. The Edinburgh College, Dr. Duncan in the *Edinburgh*

This tree is found on the Andes of Peru, near Ayavaca, growing at heights from 6250 to 8300 feet, where the mean temperature varies between 59 and 62 degrees, on a bottom of micaceous schist in the woods of Caxanuma, Uritucinga, Villonaco, and Monge.[1] It is a lofty, handsome tree, always in leaf; and exudes, wherever it is wounded, a yellow astringent juice. The trunk is about eighteen feet in height and fifteen inches in diameter, erect, with a cracked ash-coloured bark: the branches are round, in opposite pairs, erect, brachiated; with the younger ones obscurely quadrangular at the nodes. The leaves are of a lively green, shining, oval, lanceolate, about three inches long, with a little pit in the axillas of the nerves on the under surface, which is filled with an astringent aqueous fluid, and having the orifice shut with hairs; and they stand on footstalks one-sixth of their length, flat above, and convex below. The stipules are two, acute, silky, contiguous, and caducous. The flowers, which are odorous, of a whitish rose colour, and furnished with little bracteas, appear in terminal, brachiated, leafy, trichotomous panicles, supported on round peduncles and pedicels, that are powdered and silky. The calyx is of a globular bell shape, five-toothed, powdered and silky like the peduncles, with the teeth acute, very short, contiguous, and violaceous. The corolla is somewhat salver-shaped, longer than the calyx, with the tube obscurely pentagonous, silky, more frequently of a rose colour; the *limb* wheel-shaped, with oval segments, much shorter than the *tube*, white and woolly above. The germen is globular, changing to an ovate, woody, longitudinally striated capsule, crowned with the calycinal teeth, two-celled, many-seeded, oppositely twice-furrowed, and opening from the base to the apex with two valves.

This tree affords the original cinchona of Peru, which is now very rare, 110 quintals only being cut, instead of 4000 which was the quantity in 1779, and reserved for the use of the Spanish government.[2] Zea says it is the *lancifolia* of Mutis, under which we have placed it; and there is also a great affinity between it and the *scrobiculata* of Humboldt, according to that celebrated traveller. The bark of the *lancifolia* is the yellow bark of the shops, the Quina Naranjada of the Spaniards. It is known in commerce by the name of Calisaya[3]; and is pre-

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Dispensatory, and Dr. Powell in his Translation of the *London Pharmacopœia*, however, regard it as that which yields the *pale* bark. At the same time, from the quantity and low price of the yellow bark in England, I am inclined to think it is the produce of some yet undescribed species.

[1] As the *Condaminea* of Humboldt is evidently a variety, if not the same species meant by Mutis, we have availed ourselves of his accurate description.

[2] Estan raro, que apenas corresponde á uno par mil de las otras especies juntas. *Ann. de Hist. Nat.* tom. ii. p. 210.

[3] The name *Calisaya* is the generic name by which the Peruvian Indians distinguish the superior barks. *MS. of Dr. Devoti.*

ferred in South America to the pale Cinchona. It is brought to this country in chests containing about 90 to 100 pounds each; and consists of pieces about eight or ten inches in length, some quilled, but the greater part flat.[1] The quilled pieces are less rolled and thicker than the quilled pale bark; and the epidermis, which is of a tawny greyish brown colour, and covered with flat and stringy lichens, more rough and chopped, easily separating, and often as thick as the bark itself, which is about one-eighth of an inch; while the interior is of a yellow colour, passing to orange. The flat pieces are generally without any epidermis, and considerably thicker than the quilled: both are mixed in the same chest.

Qualities.— Yellow bark has nearly the same odour in decoction as the pale; the taste is more bitter, but less austere, and it does not afford any astringent feeling to the tongue when chewed. The internal colour is golden cinnamon, or subdued orange-yellow, becoming when moistened a lively orange. The fracture is woody and fibrous, presenting, when examined by a lens, the appearance of parallel longitudinal needle-like fibres, with a dry agglomerated powder in the interstices of a yellow colour. It is easily reduced to fine powder, and the powder preserves the colour of the bark, but is brighter. The sediment which the infusion lets fall in cooling is of a brighter colour than the dry powder. The filtered aqueous infusion has a pale golden hue, with a shade of red; is clearer, and seemingly less mucilaginous than the former: it has all the bitterness of the bark; reddens litmus paper, and precipitates solution of galls; but the precipitate does not fall so instantaneously as in the infusion of the former species. With solution of isinglass a pinkish yellow precipitate is produced: superacetate of lead throws down a precipitate; and that with tartarized antimony is more copious than the pale bark affords, and in yellowish white flakes. A solution of sulphate of iron changes its colour to a blueish green, and after many hours gives a precipitate of the same hue. The ethereal tincture has a golden colour, affords resin when evaporated, and is affected by the same re-agents as that of the pale cinchona; but the water on which it is evaporated is less highly coloured. The alcoholic tincture appears to be in every respect the same as that afforded by the pale bark. It seems to agree in most of its properties with the first species examined by Vauquelin; which he states was brought to Spain in 1788, and, owing to its having been used for the royal family, got the name of royal cinchona.

Mutis and Zea regard this as the only species of cinchona which is directly febrifuge: and assert that it never fails to cut short an ague when administered at its accession.[1]

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[1] These are distinguished in commerce by the terms *Calisaya with coat*, and *Calisaya without coat.*

2. CINCHONA OBLONGIFOLIA. *Mutis.*

Officinal. CINCHONÆ OBLONGIFOLIÆ CORTEX. *Lond. Edin.* CORTEX PERUVIANUS. *Dub.* Oblong-leaved Cinchona Bark. Red Bark.

Syn. Quinquina rouge, (*F.*) Rothe Chinarinde, (*G.*) China. (*I.*) Quina Roxa, (*S.*)

The tree yielding this bark is found on the Andes, growing in the woods on the banks of the mountain streams, in great abundance, at Chinchao, Cuchero, and Chacahnassi; flowering in June and July. It rises to a very considerable height on a single, erect, round stem, which is covered with smooth, brownish ash-coloured bark. The older branches are round, smooth, and of a rusty colour; the younger are obtusely four-cornered, leafy, and of a diluted reddish colour. The leaves are opposite, large, the full-sized ones being one or two feet in length, of an oblong oval shape, and supported on short semi-round purple petioles. They are entire, pale, on the upper surface, shining, on the under veined with veins that turn to a purplish colour; and at the base of each are numerous bundles of white bristles: the stipules are supra-axillary, interfoliaceous, opposite, contiguous, united at the base, and of an obovate figure. The flowers appear in large, erect, much compounded terminal panicles, somewhat branched, on long brachiated many-flowered peduncles, the calyx is small, five-toothed, and of a purple colour; the corolla white and odorous, with the limb spreading, and hairy within: and the filaments are inserted into the tube of the corolla, and support oblong anthers bifid at the base. The capsules are large, oblong, obscurely striated, slightly curved, and crowned with the calyx.[2]

This tree is named in the vernacular Spanish *Cascarilla de flor de Azahar*, from the flowers resembling in odour those of the orange; and its bark is the *Quina roxa* and *colorada* of commerce. The bark is brought to this country in chests, which contain from 100 to 150lbs. each. It consists of various sized pieces, covered with a thin and rough entire reddish brown epidermis. The greater number of the pieces are flat, but some are partially quilled, as if taken from half the circumference of the branches to which they belonged. Under the epidermis there is an intermediate layer, which is dark coloured, compact, brittle, and seemingly resinous; and within it the internal part is woody, fibrous, and of a rust-red colour. The fracture, examined by a lens, consists of close longitudinal parallel needle-form fibrillæ of a pale red colour, with a deep red agglomerated powder in the interstices. The powder is of a deeper colour than the internal part of the bark.

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[1] *Annales de Historia Natural.* ii. 609.

[2] *Flora Peruv.* ii. 53. *t.* 190.

Qualities. — Red cinchona bark has a weak peculiar odour; and its taste is much less bitter, but more austere and nauseous, than the barks of the other species. The aqueous infusion has a pale ruby colour, a slight degree of bitterness, and a decided astringency. It lets fall a sediment of a brighter hue than that of the dry powder. It reddens litmus paper[1], is slowly precipitated by the solution of galls, the supernatant liquor being perfectly colourless; and a very light, flocculent, ruby-coloured precipitate is produced by the solution of isinglass: it is not altered by tartarized antimony, nor by the surperacetate of lead; and the sulphate of iron makes it assume a dirty yellow olive colour only, little being precipitated. The ethereal tincture is of the same colour, and exhibits the same appearances as that of the two former species, when treated in a similar manner. The alcoholic is of a very deep brownish red colour; when diluted with water a red flocculent matter falls down; and it precipitates the solutions of sulphate of iron, and of tartarized antimony, the former of a black colour, and the latter red. It comes nearest to the second species examined by Vauquelin, which he calls *Santa Fé Cinchona*; and differs from his *Cinchona magnifolia* in reddening litmus paper, and precipitating tannin.

This bark was introduced by Don Sebastian Josef Lopez Ruiz, in 1778; and is considered by Zea and Mutis as the least directly febrifuge of the three kinds we have described: but it possesses powerful astringent and antiseptic properties; consequently its use is contra-indicated in inflammatory and bilious affections.

3. CINCHONA CORDIFOLIA. *Mutis.*

Officinal. CINCHONÆ CORDIFOLIÆ CORTEX. *Lond. Edin.*[2] CORTEX PERUVIANUS. *Dub.* Heart-leaved Cinchona. The common *pale* bark of the shops.

Syn. Quinquina jaune (*F.*) Chinarinde, Rieberrinde (*G.*) China (*I.*) Quina amarilla (*S.*)

The tree which affords this bark is found on the mountains of Quito and of Santa Fé, growing along their skirts, and on the plains; flowering from May to September. It is a spreading tree, rising on a single, erect, round stem of no great thickness; and covered with a smooth bark externally of a brownish gray colour. The younger branches are quadrangular, smooth, leafy, sulcated and tomentose: the leaves, which are

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[1] Fourcroy found in it a portion of citric acid, some muriate of ammonia, and muriate of lime. See *Thomson's Chem.* v. 216.

[2] The Edinburgh College, Dr. Duncan and Dr. Powel, regard this as the species yielding yellow bark.

about nine inches in length, are opposite, petiolate, spreading, of an oblong oval, cordate or egg-shape, entire, shining on the upper surface, ribbed and pubescent on the under: with the petioles flat on one side and roundish on the other, about a thumb's breadth in length, and of a purple colour. The flowers appear in large, terminal, leafy panicles, supported on long compressed tetragonous peduncles. The calyx is five-toothed, downy, and of a dull purple colour: the corolla internally tomentose; the tube of a diluted red colour; the limb shaggy, white above and purplish below; and the segments spreading, with reflected tips. The filaments are short, supporting linear anthers, bifid at the base. The germen is tomentose, and changes to an oblong, narrow capsule about one inch and a half in length, marked with ten striæ, of a reddish brown colour, and crowned with the calyx.

The bark yielded by this tree is named *Quina amarilla*[1], and *Cascarilla fina* by the Spaniards. Two other varieties of it, probably produced by distinct species, are also known in commerce by the names of *lagartado* (lizard-like) and *negrillo* (blackish), from the colour of their epidermis. It has always been known in this country by the vague name of Peruvian or Officinal bark. It is decorticated in the dry season, from September to November, which is the period at which all the kinds are barked, and the bark is carefully dried in the sun. The trees generally die after the operation.

The bark arrives in Europe packed in chests made of slips of wood roughly fastened together, and covered with skins; each of which contains about 200lbs. weight, well packed, but generally containing a quantity of dust and other heterogeneous matter. It consists of pieces eight or ten inches in length, some of them scarcely one-tenth of an inch in thickness; singly and doubly quilled, or rolled inward, the quills generally being scarcely larger than a swan's quill[2]; and others of a coarser texture, thicker and nearly flat. Both kinds have a chopped, grayish or cineritious epidermis, often covered with flat, sometimes stringy lichens; and are internally of a pallid yellow or cinnamon hue. This colour is brightened when the bark is moistened, approximating to pale orange. They are evidently the bark of the same tree; the quilled sort being that of the smaller branches, and the flat that of the larger and of the trunk. But the chests probably contain similar barks obtained from different species.

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[1] *Yellow* or *pale bark;* the adjective signifying both yellow and pale, or wan. The name appears to be used in contradistinction to *naranjada,* orange colour, which is applied to the first officinal species.

[2] The great desire of our bark merchants to procure quill bark has induced the bark gatherers often to produce this effect by heat, which always diminishes the virtue of the bark. *MS. of Don Felix Devoti of Lima,* in my possession.

Qualities. — Good bark of this description has scarcely any odour when in substance; but during decoction the odour is sensible, and agreeably aromatic. The taste is bitter, but not unpleasant, slightly acidulous and austere, resembling in some degree that of a dried rose. It is light, and breaks with a close fracture, with the internal fibres somewhat drawn out. The powder of the quilled kind is paler than the bark; of a uniform pale cinnamon hue: but the flat kind yields a deeper coloured and browner powder. The best specimen of this bark which could be procured by me, and subjected to experiment, gave the following results: Water at 212° extracted all its active principles; affording an infusion, when filtered, of a pale yellow or straw colour, which had the odour and taste of the bark. The infusion reddened litmus paper; was instantly and copiously precipitated by solution of galls; and in a smaller degree, and more slowly, in yellowish flocculent flakes, by solution of isinglass. A solution of tartar emetic was rendered turbid, and slowly precipitated by it; but this effect was quickly and copiously produced by superacetate of lead. Sulphate of iron changed its colour to bright olive green, but was scarcely precipitated. Decoction affords a more saturated tincture, with a colour resembling the cold infusion of the C. lancifolia; and a yellowish precipitate is deposited. The powder macerated in sulphuric ether afforded a golden yellow tincture, which reddened litmus paper, and left a pellicle of bitter resin when evaporated on the surface of water, to which it gave the colour of the tincture. This coloured water had the flavour of the watery infusion, but differed from it, in not precipitating the solution of galls and tartar emetic; and in throwing down a copious precipitate from the solution of sulphate of iron. With alcohol the powder afforded a tincture of a deep orange hue, which precipitated sulphate of iron, tartarized antimony, and tannin; became turbid when added to water, and let fall a light reddish precipitate. From the effects of these re-agents on the aqueous infusion of this bark, it appears to be the same as the 3d and 15th species examined by Vauquelin; which he names *superior gray cinchona*, and *common cinchona of Peru.*[1]

According to Mutis and Zea, it is indirectly febrifuge only: but when genuine both the varieties of it are excellent remedies.

The most complete examinations of Cinchona, with the view of discovering on what principle its febrifuge properties depend, have been made by Vauquelin and Fabroni. The former divides all the different species into three sections according to their chemical properties.[1] The first comprises those which precipitate tannin, but not animal gelatine; the second, those which precipitate gelatine, but not tannin; and the third, those which precipitate at the same time tannin, gelatine, and tartar emetic. He conjectured that on the principles producing these effects, particularly that which precipitates infusion of galls, the febrifuge properties of the barks depend, and that they are more or less febrifuge, in proportion to the quantity of these principles that are present. He asserts that the principle which precipitates tannin is of a brown colour and bitter taste; is less soluble in water than in alcohol; and it also precipitates tartarized antimony, but not glue.[2] It has some analogies with the resinous bodies, although it furnishes ammonia on distillation: whilst the principle which in some cinchonas precipitates glue has a bitter and astringent taste; is more soluble in water than the principle, which in other kinds precipitates tan; and that it is also soluble in alcohol, and does not precipitate tartar emetic.[3] Fabroni conceives, that he is authorised in concluding from his experiments, that "the febrifuge virtue does not belong essentially and individually to the astringent, the bitter, or any other soluble principle, as the quantity of these increases by long boiling, while the virtues of the decoction decrease. Neither does the febrifuge virtue reside in that principle which destroys the emetic property of tartarized antimony, or precipitates iron, since the decoction contains more of it than the infusion, while its virtues are evidently less."[4] Hence we may conclude from these doubts, and many others that have been raised, that much is yet to be done before the principle of cinchonas effective in the cure of fevers be ascertained.[5] We may, however, venture to state the following as the known active constituents of cinchonas: *cinchonin*, *resin*, *extractive*, *gluten* or *ferment*, *volatile oil*,[1] and *tannin*. I separated the *resin* in a pure state by evaporating the ethereal tincture on the surface of cold water; and the *gluten* Fabroni found was separable by water, occasioning the spontaneous fermentation of the decoction and infusion in summer, and decomposable by fermentation. They also contain several salts having lime for their basis, one of which, peculiar to yellow bark, Descamps, an apothecary at Lyons, discovered, and erroneously ascribed to it the febrifuge property of the bark. Vauquelin found it to consist of lime, and a peculiar hitherto unknown acid, which he denominated *kinic*, and therefore termed the salt a kinate of lime.[2] M. M. Alibert and Cabal demonstrated the presence of iron in cinchona, by incinerating the bark, dissolving the ashes in nitric acid and adding prussiate of potash, which precipitated prussiate of iron.

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[1] *Annales de Chimie*, lix. 116.

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[1] He examined 17 different kinds, but was not able to ascertain the names of the trees from which they were obtained.

[2] The effect of this principle was first noticed by Dr. Maton; and soon after by Seguin, who immediately concluded that it was gelatine; but this opinion was proved to be erroneous by Dr. Duncan, jun. who found that it was a principle sui generis, and named it *cinchonin.* Vide *Nicholson's Journal*, vii. 226.

[3] *Annales de Chimie*, l. c. [4] *Edinburgh Medical and Surgical Review*, ii. 338.

[5] In consequence of a chemical theory of the mode in which cinchona acts on the living body, Fabroni made some curious experiments to ascertain the relative affinity of different cinchonas to oxygen. In imitating his experiments with the three officinal species, I found that when half a drachm of each of these barks in powder was separately mixed with half a fluid ounce of strong nitric acid, in similar vessels, the temperature of the atmosphere at the time being 70°, and that of the acid 71°, in the space of four minutes, the heat produced rose the mercury in the thermometer as follows:

Common pale bark, — to 120°.
——— yellow bark, — 123°.
——— red bark, — 119°.

The mixture, in each vessel, was gradually swollen as the heat increased, and nitrous fumes were given out, showing the evident decomposition of the acid.

As cinchona bark occasionally varies in its powers, and is often adulterated with other inferior barks even by those who gather it; arising either from ignorance, or from a fraudulent desire of more quickly completing their contracts; it is of importance to be able to distinguish good bark, and the best varieties from those of an inferior description. Mutis informs us, that the old trees furnish the best bark; and that the bark taken from the trunk and thicker branches, is superior to that from the younger branches. The following directions for choosing bark are those generally attended to in South America[3]: The essential characteristics are *colour*, *taste*, and *smell*; the secondary or accidental ones are *exterior coat*, *fracture*, *weight*, *thickness*, and *quill*. The best bark of the first class is of an orange yellow colour; and the goodness decreases as the colour varies from this to a very pale yellow. When of a dark colour between red and yellow it is always to be rejected; as this colour designates either that it is of a bad species, or that it has not been well preserved from the air and moisture. This dark colour, however, must not be confounded with a red colour in the inside, which constitutes a distinct species. The *taste* of bark should be bitter, but not nauseous nor very astringent, with a slight agreeable acidity just perceptible to the palate; and when chewed it should not appear in threads, nor of much length. The *odour* of any of the barks is not very strong; but when they have been well cured and preserved, it is always perceptible; and the stronger it is, provided it be pleasant, the better may the bark be considered. The appearance of the *coat* or epidermis has led to many mistakes. It is merely accidental; depending on the variation in height of the ground, and the exposure of the branches to the sun and air. Seven distinct appearances of the epidermis are remarked: 1. Negrillo, dark silver coat; 2. Crespillo, short curled; 3. Pardo-obscuro, dark open leopard gray; 4. Pardo-clara, light open gray; 5. Lagartado, fine dark silver, lizard-like; 6. Blanquissimo, very pale; and 7. Cenicicnto, ash-coloured. The three first are the best, and belong to bark produced on the highest mountains: the others rank in the order of their arrangement; the epidermis being always cracked and rough in proportion as the trees have been exposed to a scorching sun. With regard to *fracture*, some of the worst barks break even and clean as if cut with a knife, and some of the best have always a more or less splintery fracture.[1] The fibres of the fracture being sharp and short indicate the bark to have been gathered from mature branches; the long and thread-like from immature branches. The best barks are generally observed to be the heaviest. In point of *thickness*, very thin bark is inert, owing to the branches from which it was taken having been too young; and very thick bark, particularly if it breaks like common wood, argues that the tree must have been sickly: yet bark exceeding a line in thickness may be good; for although it is disapproved of at Cadiz, under the name of quinon, yet excellent effects have resulted from much thicker bark in England. The moderately thick and firm bark is always preferred at Lima. The moderate *quill* of bark certainly denotes it to be of the best kind, and that it has been taken from branches of a proper age, and well dried; but the bark collectors often produce this effect by fire, when there is a want of sun, as is frequently the case in some parts of the mountains. The fraud is known by the colour being much darker; and, when the bark is split, the inside exhibiting stripes of a whitish sickly hue. It should be preserved in cases, well secured from the air and humidity.

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[1] Dr. Irwin first obtained a small portion of this oil.

[2] *Annales de Chimie*, lix. l. c. The name of the acid is derived from *kina, kina*, an old appellation of the bark. Dr. Duncan proposes to call it *cinchonic acid*, as the present name would lead to the supposition that it is procured from kino.

[3] Extracted from a MS. of *Don Felix Devoti*, a respectable physician at Lima, who has practised upwards of twenty-five years in South America.

Medical properties and uses. — Cinchona bark is a powerful and permanent tonic, possessing also antispasmodic and antiseptic powers; and is undoubtedly superior to all other remedies in counteracting febrile action, and restoring strength and vigour to morbidly weakened habits.

The stories which are related regarding the discovery of its febrifuge effects appear to be founded on fiction, and are unworthy of notice; but it is probable that the Peruvians were acquainted with its powers before the conquest of their country by the Spaniards, and from them the knowledge of it must have been acquired by their conquerors. It was nevertheless little known by Europeans, until the countess of Cinchon, wife of a viceroy of Peru, was cured by it at Lima of a tertian ague, in 1638; after which, its fame beginning to spread, it was taken to Italy in 1649, and, through the means of cardinal De Lugo and the Jesuits, was distributed over the continent.[1] It was in repute in England in 1658; but owing to its high price[2], and some prejudices formed against it, it was very little used, till Talbot, an Englishman again brought it into vogue by the many cures he performed with it in France, under the name of the *English remedy.* His secret of preparing and exhibiting it was purchased by Louis XIV. and made public. Hence the origin of some of the names by which it has been known: as *Cortex* and *Pulvis Comitissæ; Cortex* and *Pulvis de Lugo; Jesuit's bark;* also, on account of its effects, *Palos de calentura*, or fever wood; and, from the place whence it was first brought, *Peruvian bark.*

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[1] The idea of a resinous fracture being the characteristic of good bark originated when the virtue of bark was supposed to depend on the resin it contained.

It was introduced into practice for the cure of intermittent fever, and still retains the reputation it acquired as a remedy for that disease; although, owing to peculiar idiosyncrasies and other accidental causes, it has occasionally failed in this country in agues, which were afterwards removed by other remedies, particularly arsenic. Some of these failures may perhaps have arisen from the kind of the bark employed: for notwithstanding the generally received opinion, that all the kinds of bark may be indifferently used, one for another, yet there is some reason for the assertions of the Spanish and American physicians, that they vary in other respects besides their degree of activity. By them the yellow bark, *calisaya*, *quina naranjada*[3], is considered as directly febrifuge, and the best adapted for the cure of ague; the pale bark, *quina amarilla*, as only indirectly so, and better fitted for slow fevers and chronic debilities: while the red, *colorada*, *quina roxa*, is only fit to be used in cases of gangrene[1], as its use is apt to be followed with disgustful nausea, severe vomiting, and insupportable colic. The differences of opinion with regard to the best time of giving it are now nearly settled. Boerhaave[2] and others recommended that the fever should be allowed to run on for some time before it was administered; but it is now generally agreed that the bark cannot be given too early after the stomach and bowels are cleared by an emetic and cathartic. Dr. Cullen recommended the exhibition of it in a large dose or doses immediately before the accessions[3]; but Morton's method of giving it directly after the hot stage of the paroxysm ceases, and repeating it in increased doses during the intermission, until the cold stage again returns, is now generally adopted. It may be safely given however, during the paroxysm, as practised by Dr. Clarke of Newcastle, but many stomachs are apt to nauseate it at that time.

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[1] Morton gives the above account on the authority of Bollus, a Genoese merchant, who had lived long in Peru, "autor fide dignus." *De Febribus Intermit.* c. vii.

[2] It was sold at first by the Jesuits for its weight in silver; and Condamine relates that, in 1690, several thousand pounds of it lay at Piura and Payta for want of a purchaser. *Mémoires Acad. Roy.* 1738.

[3] According to Condamine, this was the bark first introduced into Europe. He says it yields by incision a yellow odorous resin; and that the Jesuits of La Paz (whence the best bark of this species is still obtained), used to gather it with care, and send it to Rome, where it was specific in agues. But the Loxa bark coming to Europe soon after, the three kinds were confounded together.

In remittent fevers, cinchona is found equally efficacious, the excitement, however, particularly in the remittents of warm climates, requiring to be previously subdued by blood-letting, and the bowels to be kept open. It renders the remissions distinct, and by degrees checks altogether the febrile action. In other affections, depending on a similar state of habit, as hemicrania, periodical pains, spasms, chorea, hysteria, epilepsy, passive hæmorrhagy, and in habitual frequently returning coughs, it is also found useful: but it does not prevent the continuance of those paroxysms of ague which form one of the constitutional symptoms of stricture of the urethra, and some other local affections; and which can be removed only by removing the strictures and other sources of irritation.

In the low stage of continued fevers of the typhoid type, particularly when these are attended with symptoms of putridity, as in jail-fever, cynanche maligna, scarlatina maligna, confluent small-pox, and in putrid measles, the bark must be regarded as one of the most valuable remedies. The administration of it in pure typhus has been of late years judiciously delayed until the increased excitement is presumed to be subdued, and symptoms of great debility make their appearance, or until the morbid heat be carried off, and the skin opened. Several eminent modern physicians, however, recommend it to be given early in the disease, and persevered in; but from our own experience we are inclined to consider the former the safer practice, and believe that the best effects will be produced from the cinchona, when its use, in pure typhus, is not begun till the skin becomes moist, the tongue is in part cleaned, and the urine deposits a critical sediment.

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[1] Zea, *Annales de Hist. Nat.* l. c. Rushworth discovered the efficacy of the red bark in gangrene. [2] *Aphorismi, &c.* 767. [3] *Mat. Med.* ii. 97.

[4] *Clarke* of Newcastle. *Heberden.*

Cinchona was first conjectured to be useful in gout by Sydenham, and in some cases its efficacy is sufficiently evident. In rheumatism also, Dr. Haygarth has lately strongly recommended it to be given, after the manner of Morton, Hulse, and Fothergill, from the commencement of the disease; the stomach and bowels being previously emptied by means of antimonial preparations. In my own practice I have found it useful only after the liberal exhibition of calomel, tartarized antimony, and opium, when the pains have in some degree abated, or assumed an intermittent character, and the pulse has become softer. Its efficacy in this disease is much increased by the addition of spirit of turpentine.

In phthisis, bark is found beneficial when the accompanying hectic puts on more of the intermittent form than usual; when the debility is considerable, and blood is mixed in the sputa: and in several cases of pneumonia, when, after repeated large bleedings and evacuations, the pulse continued hard and thrilling, and the blood buffy, although the expectoration was free and the skin open, we have seen bark produce the happiest effects.

In various cutaneous diseases, as lichen agrius, and lividus; in purpura[1]; in impetigo erysipelatodes and scabida; in erysipelas, and extensive ulcerations both from common inflammation and venereal affections[2]; in the termination of all acute diseases after the urgent symptoms are subdued; and in dyspepsia, chronic debility, and nervous affections, cinchona is found to possess great efficacy.

As a local remedy, bark is sometimes used in the form of gargle in malignant sore throat and aphthous affections; and as a wash to fœtid gangrenous sores: but in these cases the red bark is to be preferred. Powerful effects also are said to have been produced upon the system by frictions with the extract, softened by saliva or oil, upon the thighs and other parts of the body. It may be efficaciously administered per anum, when it cannot be taken into the stomach: but Denman says he found no advantage from its use as a clyster in the low state of puerperal fever, in which it has been highly extolled.

Cinchona bark is administered in a variety of forms. (See *Preparations and Compositions.*) In substance it is reduced to the state of an impalpable powder; and although it loses some of its activity during the process of pulverization, yet, when it can be retained on the stomach, this is the best form of the remedy.[1] If it excite nausea or vomiting, or operate as a cathartic, or occasion costiveness, these inconveniences may in some degree be obviated by combining it with aromatics, opium, or a cathartic, as circumstances direct; or some of the lighter preparations, in which its active principles are supposed to be extracted, and free from the grosser parts, may be employed. It may be advantageously combined also with oxide of iron. The powder is given mixed in wine or water; or, when the taste is an objection, in milk, or syrup, or a solution of extract of liquorice, all of which effectually cover the taste, provided the dose be taken directly after it is mixed.[2]

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[1] Willan.

[2] Pearson.

The dose of the powder is from grs. v. to ʒij or more. In intermittents the full dose is sometimes given at first; but in other diseases grs. v. x. or xv. are sufficient to commence with, the dose being repeated every two, three, or four hours, and gradually increased, until one or two ounces, in some cases, be taken in twenty-four hours.

Officinal preparations. *Infusum Cinchonæ.* L. E. D. *Decoctum Cinchonæ.* L. E. D. *Extractum Cinchonæ.* L. E. *Extractum Cinchonæ resinosum.* L. D. *Tinctura Cinchonæ.* L. E. D. *Tinctura Cinchonæ composita.* L. E. D.

CINNAMOMI CORTEX. Vide *Laurus Cinnamomum.*

CINNAMOMI OLEUM. Vide *Laurus Cinnamomum.*

CITRUS. *Spec. Plant. Willd.* iii. 1426.

Cl. 18. *Ord.* 3. Polyadelphia Icosandria. *Nat. ord.* Pomaceæ *Linn.* Aurantiæ *Juss.*

G. 1391. *Calyx* five-cleft. *Petals* five, oblong. *Anthers* twenty, the filaments united into different parcels. *Berry* nine-celled.

Sp. 1. C. *medica.* The Lemon-tree. *Med. Bot. 2d edit.* 528. *t.* 189.

Sp. 4. C. *Aurantium.* The Orange-tree. *Med. Bot.* 523. *t.* 188.

1. CITRUS MEDICA.[3] Var. β *C. Limon.*

Officinal. LIMONES. LIMONUM CORTEX.—OLEUM. *Lond.* CITRI MEDICÆ CORTEX: OLEUM VOLATILE: SUCCUS. *Edin.* LIMON; FRUCTUS SUCCUS; EPIDERMIS, EJUSQUE OLEUM ESSENTIALE. *Dub.* Lemons: their rind, and its essential oil.

Syn. Citronier (*F.*) Citrone (*G.*) Limone (*I.*) Citri (*S.*) Lémōn (*Arab.*) Lému (*H.*) Jambéra (*Sans.*)

The lemon-tree is a native of Assyria and Persia, whence it was brought into Europe; first to Greece, and afterwards to Italy.[4] It is now cultivated in Spain, Portugal, and France, and is not uncommon in our green-houses.[1] It is a beautiful ever-green, of small growth, sending off numerous branches covered with a grayish bark. The leaves are alternate, of a shining pale green colour, ovate, acuminate, about four inches long, and two inches broad, slightly indented at the edges, and supported on naked linear footstalks. The flowers, which appear the greater part of the summer, are odoriferous, large, and placed on simple and branched peduncles, arising from the smaller branches. The calyx is saucer-shaped, with the teeth pointed; the petals are oblong, concave, white, with a purplish tinge on the outside: the filaments, united at their base into four parcels, support yellow vertically placed anthers; and the germen is superior, roundish, and having a simple style with a globular stigma. The fruit is an ovate berry, pointed at each end, rough, punctured, externally of a pale yellow colour, and internally divided into seven, nine, or eleven cells, containing four seeds in each, and filled with vesicles distended with an extremely acid juice. The rind is double: the exterior part thin, yellow, and chiefly made up of a great number of glands filled with a very fragrant oil; the interior is thicker, whiter, and coriaceous.[2]

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[1] Fabroni says, "Cinchona loses its solubility, and consequently its activity, by long exposure to the air, and by pulverization long protracted with the view of rendering it as fine as possible. From $\frac{12}{100}$ to $\frac{16}{100}$ are obtained from bruised cinchona, which in fine powder yields only $\frac{6}{100}$ or $\frac{7}{100}$ to water.

[2] Mutis conceiving that fermentation is the best method for extracting the active part of cinchona, has proposed to make a beer of it, by fermentiug one part of the bark in powder with eight parts of honey or sugar, and 80 or 100 of water. And Alibert having persuaded a brewer to make some beer with cinchona, administered it to convalescents weakened by protracted intermittents, with the best effects.

[3] Μηλεα μηδικη Dioscoridis.

[4] Venit in Italiam post Virgilii et Plinii tempora, ante Palladii. *Willd. S. P.* iii. 1426.

Lemons are brought to England from Spain and Portugal packed in chests, and each lemon separately rolled in paper. The Spanish lemons are most esteemed.

Qualities. — Lemon *juice* is sharp, but very gratefully acid. It consists principally of the citric acid, mucilage, extractive matter, a small proportion of sugar and water. Before Scheele's process was known, many different unsuccessful plans were adopted for separating the citric acid; which is now obtained in a crystallized form, and admitted into the London and Dublin pharmacopœias.[3] The simple juice, although well depurated of its extractive matter, yet soon spoils; and therefore the crystallized acid dissolved in water is generally used in its stead. The *rind* is warm, aromatic, and slightly bitter, qualities depending on the essential oil it contains, which is given out to water, wine, and alcohol. The *essential oil* obtained by distillation is extremely light, nearly colourless, and fragrant; and has the same taste as the rind, only in a greater degree. It is very perishable, yet does not readily rise with alcohol or with proof spirit.

Medical properties and uses. — Lemon *juice* is refrigerant and antiseptic. It is given diluted with water and sweetened, forming the beverage called lemonade, to quench thirst, and abate heat in febrile and inflammatory diseases. Given alone to the extent of a table spoonful for a dose, it allays hysterical palpitations of the heart; and in combination with carbonate of potash (f℥ſs of the juice to ℈j of the salt), taken in a state of effervescence, is used with great success to stop vomiting, and determine to the surface. A still more useful and pleasant effervescing draught is made by putting a table-spoonful of lemon juice, mixed with a small quantity of sugar, into a tumbler, and pouring over it half a pint of aërated soda water. On account of its antiseptic powers, lemon juice is successfully used in scurvy; and for this purpose, large quantities of it, in a concentrated state, are distributed in the navy; but the continued use of it is said to be hurtful to the general health of the men, and to hasten the progress of phthisis where it makes its appearance. The citric acid is likely to supersede its employment in the navy. Dr. Wright observes, that its powers are increased by saturating it with muriate of soda, and recommends such a mixture in remittent fever, dysentery, colic, putrid sore throat, and as being almost specific in diabetes and lientery. It is given also united with camphor, infusion of cinchona, and wine, in the same cases; and mixed with ardent spirits and water with sugar, it forms *punch*, which is a useful cordial in low fevers.

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[1] It was first cultivated in Britain in the Oxford garden, about the year 1648.

[2] *Gærtner de Fructibus*, vol. ii. p. 189.

[3] For an account of this acid, vide *Acidum citricum* among the Preparations.

Lemon peel is added to stomachic tinctures and infusions; and is particularly applicable in dyspepsia, arising from irregularities in diet, and the inordinate use of ardent spirits.

The *essential oil* is chiefly used as a perfume, to cover the smell of sulphur in ointments compounded with it.

Officinal preparations Of the juice — *Syrupus Limonis.* L. E. D. Of the rind. *Aqua Citri medicæ.* E.

2. CITRUS AURANTIUM.[1]

Officinal, AURANTII BACCÆ, CITRI AURANTII CORTEX. *Lond.* CORTEX SUCCUS. *Edin.* FRUCTUS SUCCUS, CORTEX EXTERIOR, FRUCTUS IMMATURUS, ET FLORUM AQUA STILLATITIA. *Dub.* The fruit and outer rind of the Seville orange.

Syn. Oranges (*F.*) Pomeranzin (*G.*) Arancio (*I.*) Naranja (*S.*) Narenj (*H.*) Nágaranga (*San.*)

The orange-tree is a native of India and Persia, but is now abundantly propagated in the south of Europe and the West India islands, and is also found in our green-houses. In its general appearance it resembles the lemon-tree, but the leaves, which are not so large as those of the lemon, and more pointed, are entire, smooth, and furnished with wings or appendages on the footstalk, by which it is particularly distinguished. The flowers, like those of the lemon, appear all the summer, are large, white, odorous, and arise from the smaller branches upon simple and branched pedicels. The parts of the flower resemble closely those of the lemon. The fruit is a globular berry, rough, and of a deep reddish yellow or orange colour; internally divided into nine cells filled with a vesicular pulp, and each containing from two to four seeds. The rind, like that of the lemon, is double: the exterior thin and glandular; the interior thick, whitish, and fungous. The China or sweet orange (Citrus *sinensis*) is a variety of the same species as the Seville orange, and is medicinally employed for allaying thirst in febrile diseases. Both are imported chiefly from Spain, in chests, and packed in the same manner as lemons.

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[1] Aurantia forte a corticis colore, qui colore auri relucet, ut aurea mala vere nominari possunt: sive ab Arantia oppido dicta, veteribus ignota, insitione ad nos devenerunt. *Bauhin. Pin.* p. 436.

Qualities. — The *juice* of the Seville orange is a grateful acid liquor with a slight degree of bitterness. It consists of nearly the same principles as the juice of the lemon; with a smaller portion, however, of citric acid. The *exterior rind* has a very grateful aromatic odour, and a warm, bitter taste, depending on the essential oil contained in its glands. Both the bitter and aromatic parts are extracted by water and alcohol; and the essential oil can be obtained by distillation. The *unripe fruit*, named in common Curaçoa oranges, have the aromatic flavour of the rind with a greater degree of bitterness, and retain both when dried. They vary in size from that of a small pea to that of an acorn. The *distilled water* has the grateful perfume of the flowers.

Medical properties and uses. — The *juice* of the Seville orange is employed in the same diseases, and with the same intentions, as lemon juice, but it is not so generally used. The *rind* is a useful stomachic, carminative, and tonic; and is a common addition to bitter infusions in dyspepsia. In gout it is joined with magnesia and alkalies; and when the cinchona does not sit easily upon the stomach, it is a most useful adjunct to that remedy in whatever form administered. It has also been given alone in intermittents with seeming advantage.[1] The *oil* is only used as a perfume.

The dried *unripe fruit* (*Aurantium curassaventium*) is employed as an internal remedy in the same cases as the rind of the ripe orange. It is, however, more commonly used as a mechanical irritant in issues, for which purpose the smaller fruit is selected, and generally made round and smooth in the turning lathe. It is preferred for this purpose on account of its odour only; for the heat and moisture of the part in which the orange is lodged swells it as much as the common pea; and, therefore, it requires to be renewed once in twenty-four hours.

The usual dose of the dried rind, and of the Curaçoa orange, is from grs. xv. to ʒj, three or four times a day.

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[1] *Murray's App. Med.* v. iii. p. 289.

Officinal preparations. Of the juice—*Succus Cochleariæ comp.* E. Of the rind—*Infusum Aurantii compositum.* L. *Tinctura Aurantii.* L. D. *Syrupus Aurantii.* L. D. *Confectio Aurantii.* L. E. D. *Aqua Citri Aurantii.* E.

COC'CUS.[1] *Syst. Nat. Gmelin.* 2220.

Cl. 5. *Ord.* 2. Insecta Hemiptera.[2]

G. 229. *Rostrum* or *Snout* seated on the breast. *Antennæ* filiform. *Abdomen* bristled behind. *Wings* two, erect in the males; females apterous.

Species 22. C. *Cacti.* Cochineal Insect. *Reaum. Ins.* iv. *t.* 7. *fig.* 11, 12. *Phil. Trans.* lii. 661. *pl.* 21.

Officinal. COCCUS. *Lond.* COCCUS CACTI. *Edin.* COCCINELLA. *Dub.* Cochineal.

Syn. Cochenille (*F.*) Cochenille (*G.*) Coccinilia (*I.*) Cochinilla (*S.*) Cochineel poochie (*Tam.*)

This coccus is found in its wild state in Mexico, Georgia, South Carolina, and some of the West India islands, feeding on several species of cactus, particularly the common Indian fig or prickly pear plant (*Cactus opuntia*)[3]; but in Mexico and some of the adjoining Spanish settlements[4], where the insect is as it were domesticated and reared with great care, it feeds only on the cochineal Indian fig (*Cactus coccinilifer*), which is cultivated for this purpose; and on it the insect attains to a greater size than in the wild state. It is a small insect, very seldom exceeding a barley grain in magnitude; with the head, except in the males, scarcely distinct from the body, which is depressed, downy, and transversely rugose. The abdomen is of a purplish colour, and the legs are six in number, short and black. The males, which are few in proportion to the females, there being one only to 150 or 200 females, are winged, slender and active, with the body of a red colour; the head is small, but distinct, furnished with jointed feelers, and two long diverging white hairs about five times the length of the body, which proceed from the tail; and with wings which lie flat when the insect rests or walks, but are erected when it flies. The females have no wings, and are sluggish; scarcely ever moving from the part of the plant where they fix themselves. The back is hemispherical and crossed by numerous wrinkles; on the breast is an awl-shaped papilla, through which a fine thread is spun to form a web, with which the insect envelops itself as soon as it is fully impregnated; when it becomes torpid, and immediately after laying its eggs dies, and is a mere useless husk.

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[1] *κοκκος βαφικη*, Dioscoridis, is the Kermes or Coccus *Ilicis*, Linn. which was known, as a dye, by the Phœnicians, before the time of Moses; and was the *tola* of the Jews. *Beckman Hist. of Inventions*, translation, vol. ii. p. 185.

[2] Cl. vii. *Ryngota.* Spec. 21, *Fabricii.*

[3] These plants have neither stem nor leaves, in the common acceptation of these words, but consist of roundish or oval compressed joints that grow out of each other.

[4] "Oaxaca, Kascala, Chululà, Neuva Gallicia, Chiapa, in New Spain; and Hambatio, Loja, and Tucuman, produce the greatest quantity." *Ulloa*, quoted by *Bancroft.*

The wild cochineal is collected six times in the year, just before the females begin to lay their eggs; a few being left on the plants to furnish a future supply. But the domesticated insect is collected thrice only in the same space of time, the domestication diminishing the number of broods to three in the year, owing to their propagation being suspended during the rainy seasons, whilst the downy covering of the wild species allow them to withstand the inclemency of these seasons. At the third gathering, branches of the plant, to which a certain number of females is left adhering, are broken off and preserved with great care under cover during the rainy season; and after this is over they are distributed over the out-door plantations of the cactus, where they soon multiply, and in the space of two months the first crop is fit to be gathered. The insects are detached from the plant by means of a blunt knife, then put into bags and dipped in boiling water to kill them; after which they are dried in the sun: and although they lose two-thirds of their weight in this process, yet about 600,000 lbs.[1] are brought annually to Europe.

Cochineal was introduced into Europe about the year 1523. The domesticated kind, which is not only much larger but yields a richer colour, and is consequently most esteemed, is known, in the language of the Spanish merchants, by the name *grana fina;* the wild is one half the size only of the other, covered with white down or powder[2], and is denominated *grana silvestra;* but as we receive them, both the kinds are often mixed together. They are imported in bags, each containing about two hundred-weight, and have the appearance of small dry shrivelled rugose berries, or seeds, of a deep brown-purple or mulberry colour, with a white matter between the wrinkles. In this state they suffer no change from length of keeping. Dr. Bancroft directs that cochineal to be chosen as the best, which "is large, plump, dry, and of a silver white colour on the surface."[3]

Qualities.— Cochineal has a faint heavy odour, and a bitter austere taste. It is easily pulverized, affording a powder of a purplish red hue; the colouring matter of which is taken up by water, alcohol, and solutions of the pure alkalies. The watery infusion is of a violet crimson, the alcoholic of a deep crimson, and the alkaline of a deep purple hue. The colour of the watery infusion is brightened by the acids, supertartrate of potass, and alum, and at the same time partly precipitated. It is also precipitated by sulphate of iron of a brownish violet colour, the liquid remaining pale yellowish brown; and by sulphate of zinc and acetate of lead of a purple violet, the liquid being perfectly colourless. Hence cochineal is incompatible as a colouring matter with these metallic salts.

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[1] Each pound is said to contain 70,000 insects. The monopoly of cochineal is still in the hands of the Spaniards; but attempts are making to propagate it in the East Indies, if the death of Mr. Anderson have not terminated them. Of the whole quantity brought to Europe, about 150,000 lbs. may be considered as the present annual consumption of Great Britain, (1812), which at 30s. per lb. cost 225,000l. sterling.

[2] This downy matter is spun by the insect, with the view, it is said, of defending it against cold and rain.

[3] *Philosophy of Permanent Colours*, 2d edit. 1. p. 434.

Medical properties and uses.—Cochineal has lately been recommended as an antispasmodic and anodyne in hooping cough. I have had no experience of its effects; and believe it to be better fitted for giving a fine colour to tinctures, and similar preparations.

COCHLEARIA.[1] *Spec. Plant. Willd.* iii. 448.

Cl. 15. *Ord.* 1. Tetradynamia Siliculosa. *Nat. ord.* Siliquosæ *Linn.* Cruciferæ *Juss.*

G. 1228. *Silicle* emarginate, turgid, rugged; with gibbous, obtuse valves.

Species 8. C. *Armoracia.* Broad Horse-radish. *Med. Bot.* 2*d edit.* 400. *Smith's Flora Brit.* 2. 690.

Officinal. ARMORACIÆ RADIX. *Lond.* COCHLEARIÆ ARMORACIÆ RADIX. *Edin.* RAPHANUS RUSTICANUS; RADIX. *Dub.* Horse-radish Root.

Syn. Cran; Raifort (*F.*) Murrettich (*G.*) Rafano rusticano (*I.*) Marvisco (*S.*) Morungȳ vayr (*Tam.*)

This plant is a perennial, growing wild in many parts of England in moist situations; and in waste ground, flowering in June: but it is generally cultivated for culinary and medicinal purposes. The root is long, tapering, and white; sending up many leaves, and a round, erect, branched stem, which rises about two feet in height. The radical leaves are petiolate, very large, lance-shaped, and waved; crenate, and sometimes pinnatifid. Those of the stem are sessile, much smaller, lanceolate, sometimes divided at the edges, at other times entire. The flowers are in terminal clusters, numerous, and of a white colour. The leaves of the calyx are ovate, concave, spreading, and deciduous; the petals white, obovate, twice the length of the calyx, and inserted by narrow claws. The germen is heart-shaped, bearing a simple permanent style, crowned with an obtuse stigma; and changing into an elliptical bilocular pod, containing four seeds in each cell, which frequently prove abortive.

As the acrimony, on which its virtues depend, is lost in some degree by drying, it should be preserved in sand in a cool place.

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[1] Named from a fancied resemblance of the leaf to an old-fashioned spoon.

Qualities.—Horse-radish has a pungent odour, and a very hot, biting, acrid taste, with some degree of sweetness. When kept until it is quite dry, it loses more than two-thirds of its weight; and in time the whole of its pungency is dissipated. Both water and alcohol extract its active principles. The infusion reddens litmus paper, and precipitates solutions of superacetate of lead and of nitrate of silver. Coction destroys its acrimony, which depends on a volatile oil that can be obtained separate when the mashed root is distilled with water. This oil is of a pale yellow colour, heavy, volatile at 60°, with an extremely pungent odour, and a sweetish, strong, acrid taste, exciting inflammation in the tongue and lips to which it is applied. Einhoff, who lately examined this root, says, the distilled watery liquid yields traces of sulphur.[1]

Medical properties and uses.—This root is stimulant, diaphoretic, and diuretic; and externally rubefacient. It is used with advantage in paralytic affections and chronic rheumatism, both internally and externally; and in dropsy, particularly when it follows intermittent fever, in which it was successfully employed by Sydenham. It has also been found efficacious in some cutaneous affections; and as a local remedy, a syrup made with an infusion of it, as recommended by Cullen[2], removes hoarseness arising from relaxation. Horse-radish may be given in substance in doses of ʒſs or more, scraped, or in small pieces swallowed whole.

Officinal preparations. *Infusum Armoraciæ compositum.* L. *Spiritus Armoraciæ compositus.* L. D.

COCOS. *Spec. Plant. Willd.* iv. 400.

Cl. 21. *Ord.* 6. Monœcia Hexandria. *Nat. ord.* Palmæ.
G. 1680. *Spathe* general, one-celled. *Spadix* branched.
Male flowers. *Calyx* three-leaved. *Corolla* tripetalous.
Female ——. *Calyx* two-leaved. *Corolla* six-petalled.
Style none. *Stigma* hollowed. *Drupe* fibrous.

Species 3. C. *butyracea.* The Mackaw Tree. *Piso, Hist. Nat. lib.* iv. *p.* 125. (Pindova.)

Officinal. COCI BUTYRACEÆ OLEUM FIXUM. *Edin.* Palm Oil.

Syn. Huile de Cocobier du Bresil (*F.*) Olio di Cocco del Brasile (*I.*)

This species of palm is a native of Brasil, and is found in abundance near the mines of Ybaquenses. It is a lofty tree with a rough bark, and the foliage forming a very dense shade. The fruit, which is collected throughout the year, is an obovate, one-celled, smooth, succulent drupe, of a yellow colour, with a point at the upper end, and at the base the hard persistent calyx. The nut has a cartilaginous skin and a fibrous pulp; and contains a cartilaginous hard kernel, having nearly the same taste as that of the common cocoa nut.

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[1] *Annales de Chimie*, lxx. 185.

[2] The syrup is made by infusing one drachm of scraped horse-radish in two ounces of boiling water, in a covered vessel, and adding double its weight of sugar. Of this syrup a tea-spoonful is to be swallowed leisurely, and repeated at intervals.

This kernel yields the oil. It is first coarsely pounded, or ground in a mill, then macerated in hot water, until it parts with its oil, which, collecting on the surface of the water, as it concretes, cools. It is afterwards purified by washing in hot water.

Qualities. — Palm oil has an agreeable odour resembling that of violets or the Florentine iris, and a slightly sweetish taste. It is of the consistence of butter, and has a light lemon yellow colour. It becomes rancid by long keeping, loses its pleasant odour, and its yellow colour fades to a dirty white. It is said to be sometimes imitated with hog's lard coloured with turmeric, and scented with Florentine Iris root.

Medical properties and uses. — This vegetable butter is emollient; and as such is sometimes used externally in frictions.

COLCHICUM. *Spec. Plant Willd.* ii. 272.

Cl. 6. *Ord.* 3. Hexandria Trigynia. *Nat. ord.* Spathaceæ *Linn.* Junci *Juss.*

G. 707. *Spathe.* *Corolla* six-parted, with a rooted tube. *Capsules* three, connected, inflated.

Species 1. C. *autumnale.* Meadow Saffron. *Med. Bot. 2d ed.* 759. *t.* 259. *Smith Flor. Brit.* 400. *English Botany*, 133.

Officinal. COLCHICI RADIX.[1] *Lond.* COLCHICI AUTUMNALIS RADIX. *Edin.* COLCHICUM; RADIX, PRIMO VERE, FOLIIS JAM APPARENTIBUS. The root of Meadow Saffron.

Syn. Colchique (*F.*) Zeitlozen, Weissen saffron (*G.*) Colchico Autumnale (*I.*) Zafran (*S*)

This is an indigenous perennial plant, generally found growing in moist rich meadow grounds, and flowering in September. The bulb is double, solid, large, egg-shaped, and covered with a brown membranous coat. The leaves, which appear in spring, are radical, spear-shaped, broad at the base, and somewhat waved. They wither away entirely before the end of summer, and are succeeded by the flower, which appears in autumn without any leaves. There is no calyx. The corolla, which is of a pale lilac colour mottled with deeper lilac, springs directly from the bulb, and consists of a tube about five inches long, two-thirds of which are sunk in the ground, and a limb divided into six lanceolate keeled segments. The filaments are the colour of the corolla, half the length of the segments, subulate, united to the upper part of the tube, and supporting yellow erect anthers. The fruit is a three-lobed, three-celled capsule, on a strong short peduncle.

The bulb, which is the part medicinally used, begins to decay after the flower is perfectly expanded, and the new bulb is perfected in the following May, at which time it is generally taken up; but the bulb is in its greatest perfection when the flower appears in autumn, and it should then be raised. It yields, when mature, on being cut transversely, a milky-looking acrid juice, which excoriates the fingers. It is used in infusions, either in wine (*vinum colchici*), or in spirit (*tinctura colchici*). A deposite forms in the wine, which Sir E. Home[1] ascertained, is extremely acrid, exciting nausea and griping, and the removal of which does not alter the virtue of the medicine in gout. Hence the bottle in which the medicine is kept should never be shaken when it is to be administered.

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[1] All the Colleges have erred in using the word *radix* instead of *bulbus.*

Qualities.—The recent bulb of this plant has scarcely any odour; but when it is dug up at a proper season of the year, the taste is bitter, hot, and extremely acrid, occasioning a burning sensation in the stomach, even when taken in a small quantity. At other seasons, however, and in some soils and situations, it possesses very little acrimony; and hence the contradictory opinions which authors have given of it. Its acrimony resides in a milky juice, and depends on an essential oil which is dissipated by drying. Vinegar and wine are the best menstrua for extracting its active qualities.

Medical properties and uses.—Meadow saffron possesses diuretic, purgative, and narcotic properties: and on the continent, where it was recommended to notice by Baron Stoerck, it is a favourite remedy in dropsy, particularly hydrothorax, and in humoral asthma. But as it does not differ in its mode of action from squill, and is more uncertain in its operation, it has not been much used in that complaint in this country. In gout, however, its efficacy has been fully ascertained; and, in allaying the pain, it may be almost said to possess a specific property. It operates on the bowels chiefly, and the nervous system.

The dose in substance is from gr. ss to grs. iij of the recent bulb made into a pill: and of the saturated vinous infusion, from ♏ xxx. to ♏ lx. may be taken whenever the patient is in pain.

Officinal preparations. *Acetum Colchici.* L. *Oxymel colchici.* D. *Syrupus Colchici autumnalis.* E.

CONIUM.[2] *Spec. Plant. Willd.* i. 1395.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 533. *Partial involucre* halved, three-leaved. *Fruit* nearly globular, five-streaked, notched on each side.

Species 1. Conium *maculatum.* Common Hemlock. *Med. Bot.* 2d *edit.* 104. *t.* 42. *Smith Flora Britan.* i. 302.

Officinal. CONII FOLIA. *Lond.* CONII MACULATI FOLIA. *Edin.* CICUTA. *Dub.* The leaves and seed of Hemlock.

Syn. Cigue ordinaire (*F.*) Schierling (*G.*) Cicuta Maggiore (*I.*) Conio manchado (*S.*)

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[1] *Phil. Trans.* 1817. part ii.

[2] Κωνειον, Dioscoridis.

Hemlock is a biennial, umbelliferous, indigenous plant, growing under hedges, by road sides, and among rubbish, flowering in June and July. The root, which is fusiform, branching, whitish and fleshy, exudes, when cut, a milky juice. The stem rises erect about four or five feet in height, is branching and leafy, round, hollow, striated, smooth, shining, and maculated with brownish purple. The lower leaves are very large, above a foot in length, on large sheathing petioles, supradecompound, and shining; the upper ones are bipinnate; the whole stand upon channelled footstalks, proceeding from the joints of the stem, are incised, smooth, of a deep-green colour on the upper surface, but paler underneath. The rays of the umbels are ten or twelve, those of the umbellules fifteen or sixteen. The involucre consists of from three to seven, short, turned down, lancet-shaped leaflets, with white edges spread at the base: the involucel of three or four leaflets on one side only, and spreading. The flowers are very small; the petals white, the outer ones rather larger than the inner, cordate, inflected: the stamens the length of the petals, supporting white orbicular anthers: the styles two, filiform, diverging, and crowned with round stigmas. The fruit is ovate, striated, *smooth*, and brownish when ripe.

Hemlock is distinguished from other umbelliferous plants, with which it may be confounded, by its *large* and *spotted* stem[1], the dark and *shining colour of its lower leaves*, and their *disagreeable smell*, when fresh and bruised, resembling in some degree the urine of a cat.[2]

For medical use, the leaves should be gathered about the end of June when the plant is in flower; the small leaflets picked off, and the footstalks thrown away. The picked leaflets are then to be properly dried (vide *Powders*, Part III.); and as exposure to the air and light destroys the fine green colour of the plant, and injures its active qualities, the dried leaflets must be preserved in boxes completely filled, by gently pressing down the leaves, then covered with a closely fitted lid, wrapped in paper and sealed; or, if powdered, the powder may be preserved good, in closely stopped opaque phials for many years.

Qualities.—The odour of properly dried hemlock leaves is strong, heavy, and narcotic, but not so disagreeable as that of the fresh leaves: the taste is slightly bitter and nauseous. They are easily pulverized; and the powder should retain the beautiful green colour of the leaves. The acrimony only of the fresh leaves is lost in drying; but the narcotic principle remains uninjured if the operation be well performed. The virtues of Conium are extracted by alcohol and sulphuric ether. To the ether it communicates a very deep green colour; and when the tincture is evaporated on the surface of water, a rich dark green resin remains, in which the narcotic principle of the plant appears to reside; it contains the odour and taste in perfection; and half a grain produces headach, and slight vertigo.

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[1] The Chærophyllum *bulbosum*, Bulbous-rooted cow parsley has a spotted stem, but the joints are swelled, and the seeds *rough*.

[2] In Ray's Synopsis, *Conium maculatum* is named *Cicuta*; a name still retained by the Dublin College; and owing to which the water hemlock, *Cicuta virosa*, has sometimes been confounded with it; and improperly used.

Medical properties and uses.—Hemlock is a powerful narcotic, and is used as such internally, and as an external application. Stoerck, whose publications first brought it into general notice, rated its powers too high, and the multitude of discordant diseases which he enumerated as yielding to it, led many sober men to doubt its efficacy altogether. Hemlock is, nevertheless, a useful narcotic; and if it has not succeeded in curing cancer in the hands of British practitioners, it has been advantageously used as a palliative in both scirrhus and open cancer, abating the pain, and allaying the morbid irritability of the system. It has also been found serviceable in chronic rheumatism, in scrophulous, syphilitic, and other ill-conditioned ulcers, and glandular tumours: in pertussis, and the protracted cough which often remains after pneumonic inflammation. An over-dose of it induces sickness, vertigo, delirium, dilatation of the pupils, great anxiety, stupor, and convulsions. The best antidote is vinegar, after the stomach has been evacuated, and the cerebral excitement reduced by bleeding and purging.

The powder of the dried leaves, if well preserved, is the best form of this remedy. Hufeland recommends the fresh expressed juice from ♏xij to ♏ lx for a dose. The dose of the powder is grs iij, gradually increasing it every day, till a slight vertigo forbids its further increase.

Officinal preparation. *Extractum Conii.* L. E. D.

CONVOLVULUS. *Spec. Plant. Willd.* i. 844.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Campanaceæ *Linn.* Convolvuli *Juss.*

G. 323. *Corolla* bell-shaped, plaited. *Stig.* two. *Capsule* two-celled, each cell containing two seeds.

* *Stem twining.*

Sp. 4. C. *Scammonia.* Scammony. *Med. Bot. 2d edit.* 243. *t.* 86.

Sp. 61. C. *Jalapa.* Jalap. *Med. Bot.* 2d *edit.* 246. *t.* 87.

1. CONVOLVULUS SCAMMONIA.[1]

Officinal. SCAMMONIÆ GUMMI RESINA. *Lond. Edin.* SCAMMONIUM; GUMMI RESINA. *Dub.* Scammony.

Syn. Scammonée (*F.*) Scammonium von Aleppo (*G.*) Scammonea (*I.*) Escamonea (*S.*) Sukmunya (*H. and Arab.*)

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[1] Σκαμμωνια, Dioscoridis.

This plant is a native of Syria and Cochinchina. It grows in abundance on the mountains between Aleppo and Latachea, and there the greater part of the scammony of commerce is obtained.[1] The root, which is perennial, is tapering, from three to four feet in length, and from three to four inches in diameter, covered with a light gray bark, and contains a milky juice. It sends up many slender, twining stems, which extend from fifteen to twenty feet in length, adorned with arrow-shaped, smooth, bright green leaves upon long footstalks. The flowers are in pairs upon the pedicels, consisting of a double calyx of four emarginated leaflets in each row; and a funnel-shaped, pale yellow, plaited corolla. The capsule is three or four celled, containing small pyramidal seeds.

Scammony is obtained from the root of this plant[2]; and is collected in the beginning of June, in the following manner: The ground is cleared away from the root, the top of which is then cut off in a sloping direction, about two inches below the place whence the stalks spring; and the milky juice which flows from it is collected in a shell fixed at the most depending part. Each root yields a few drachms only, which are drained off in about twelve hours. "This juice from the several roots is put together, often into the leg of an old boot, for want of some more proper vessel, where in a little time it grows hard, and is the genuine scammony." "The Jews," Dr. Russell says, "buy the scammony while it is soft, and mix it with the expressed juice of the stalks and leaves, with wheat-flour, ashes, fine sand, or whatever else can answer their purpose." It is imported from Aleppo in what are called drums, which weigh from 75 to 125 lbs. each; and from Smyrna in cakes like wax, packed in chests. The former is light and friable, and is considered the best; that from Smyrna is more compact and ponderous, less friable, and fuller of impurities.

Qualities. — Good Scammony is light, friable, and externally like a honey-comb. It has a peculiar, rather heavy odour, not unlike that of old ewe milk cheese; and a bitterish, slightly acrid taste. The colour is blackish or blueish gray, changing to dirty white when the surface of the mass is rubbed with the wet finger. The fracture is irregular but smooth, faintly shining, and the sharp edges of the shivers are of a lighter gray colour, and translucent. It is pulverulent; and the powder has a light gray colour. Its specific gravity is 1.235.[3] When it is of a dark colour, heavy and splintery, it should be rejected. When triturated with water, nearly one-fourth of it is dissolved, and the solution appears slightly mucilaginous, opaque, and of a greenish gray colour. This solution is not affected by alcohol, solutions of superacetate and acetate of lead, or sulphate of iron, nor precipitated by the acids; but with sulphuric acid it gives out the odour of vinegar. Solution of ammonia does not alter it, but that of potash occasions a yellowish precipitate, which is quickly re-dissolved on the addition of an acid. Ether takes up two parts in ten of scammony, and when evaporated, leaves a brownish semi-transparent resin. Alcohol dissolves two-thirds of its weight; but proof spirit is its best menstruum, taking up the whole except the impurities. Aleppo Scammony contains, according to Bouillon La Grange and Vogel, 0.60 of resin, 0.02 of extractive, 0.03 of gum, and 0.35 of waste. Smyrna scammony contains scarcely one half the quantity of resin; but more gum and extractive.

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[1] *Russell's Nat. Hist. of Aleppo*, ii. 246.

[2] No other part of the plant possesses any medicinal quality. *Russel*, l. c.

[3] *Brisson.*

Medical properties and uses.— Scammony is a drastic cathartic, operating, in general, quickly and powerfully. The ancients were acquainted with its purgative qualities; and also employed it as an external application for removing hard tumors, itch, scurf, and fixed pains; but for the latter purposes it is now never used. It is a good purgative, in the torpid state of the intestines, in leucophlegmatic, hypochondriacal, and maniacal subjects; in worm cases, and the slimy state of the bowels to which children are subject; and as a hydragogue cathartic in dropsy. Scammony has been regarded by some as a cathartic of so irritating a nature as to require to be corrected by exposing it to the fumes of sulphur, defæcating it with lemon juice and other acids, and uniting it with demulcent mucilages: but, except in an inflamed or very irritable state of the bowels, it is a safe and efficacious purgative. It is however apt to gripe, on which account it is generally united with an aromatic, or a drop of some essential oil.

The dose of scammony is from grs. v. to grs. xvj, in powder, or as a bolus, or in the form of mixture, triturated with almonds, gum, or extract of liquorice, and water.

Officinal preparations. *Confectio Scammoniæ.* L.D. *Pulvis Scammoniæ comp.* L.E.

2. CONVOLVULUS JALAPA.

Officinal. JALAPÆ RADIX. *Lond.* CONVOLVULI JALAPÆ RADIX. *Edin.* JALAPA; RADIX. *Dub.* Jalap root.

Syn. Jalap (*F.*) Jalappenharz (*G.*) Scialappa (*I.*) Jalapa (*S.*)

This species of convolvulus is a native of South America, taking its name from Xalappa, a city of Mexico.[1] It grows in a dry sandy soil, and flowers in August and September. The root is perennial, of an irregular egg-shape, and a dark almost black colour on the outside, ponderous, large[1], and when fresh, abounding with a milky juice. It sends up many triangular, tuberculated, twining, twisted stems, which extend upwards of ten feet, with smooth petiolated leaves, of a bright green colour, varying in shape, some being cordate, others angular, and a few oblong and pointed. The flowers are on short axillary peduncles that send off two pedicels, each bearing a large, bell-shaped, entire, plaited flower, of a reddish colour externally, and a dark purple within; with a calyx composed of five oval, concave, pale green leaves, somewhat indented at their points. The anthers are of a yellow colour, large, on slender short filaments; the style is shorter than the filaments, and the germen oval. The seeds are bristled.

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[1] It was cultivated in England by Mr. Miller in 1668; and a few years ago two specimens were in vigorous growth in Kew gardens, slips of the original plant, introduced there by Mons. Thouin in 1778.

The root of this plant, which is the jalap of the shops, was first brought to Europe about the year 1609 or 1610.[2] The best comes from Vera Cruz in transverse slices, and also in egg-shaped, pointed, entire tubers, covered with a very thin, wrinkled, brown cuticle. That which is sliced is more liable to be adulterated, which is said to be sometimes done with slices of briony root; but the fraud is easily discovered by the spongy texture and whiter colour of the latter.

Qualities. — Good jalap root has a sweetish heavy odour when broken, and a sweetish slightly pungent taste. It is heavy, compact, and hard, with a shining resinous fracture, which shows the internal part of a yellowish gray colour, interspersed with deep brown concentric circles. It is pulverulent, affording a powder of a pale brownish yellow colour. Both water and alcohol separately extract a part, and when mixed the whole of the active constituents of jalap. Ether dissolves three parts of ten submitted to its action; and affords, when evaporated over water, a transparent insipid resin and some extractive. Hence jalap appears to contain resin, starch, extractive, and ligneous matter.

Medical properties and uses. — Jalap is a stimulant cathartic, acting briskly on the bowels; and although occasionally griping severely, yet safe and efficacious. It is used in the same cases as scammony, whenever it is required effectually to evacuate the intestines: and as a hydragogue purgative it is supposed to possess singular efficacy. It has been asserted that it proves hurtful in hypochondriasis, bilious habits, and fevers, except of the intermittent kind; but Doctor Hamilton used it in all these instances, in typhus, and the exanthemata with the best effects.[1] The watery extract purges moderately without griping, and is therefore well adapted for children; but the alcoholic scarcely at all purges, although it occasions the most violent tormina and gripings. It is frequently triturated with hard sugar, which renders its powder finer, and increases its activity; and with other cathartics, by which the action of both is reciprocally improved. In dropsical affections, the supertartrate of potash is a useful addition; and in the cachexia and worms, calomel, the operation of which it greatly quickens.

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[1] A root of jalap, which was carried by Michaux, junior, in 1803, from the botanic garden of Charlestown to Paris, and planted there in the garden of the Museum of Natural History, where it now grows, weighed 47 pounds and three quarters. *Memoires de l'Institut.* tom. vi. 387.

[2] *Bauhin. Prodromus*, 135.

The dose is from grs. x. to ʒſs in powder, pills, or bolus; with a drop or two of essential oil to prevent griping.

Officinal preparations. *Pulv. Jalapæ comp.* E. *Extractum Jalapæ.* L. E. D. *Tinctura Jalapæ.* L. E. D.

CONTRAJERVÆ RADIX. Vide *Dorstenia Contrajerva.*

COPAIFERA. *Spec. Plant. Willd.* ii. 630.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. Ord.* Dumosæ *Linn.* Leguminosæ *Juss.*

G. 880. *Calyx* none. *Petals* four. *Legume* ovate. *Seed* one, with an ovate arillus.

Species 1. C. *officinalis.* Copaiva tree. *Med. Bot. 2d ed.* 609. *t.* 216.

Officinal. COPAIVA. *Lond.* COPAIFERÆ OFFICINALIS RESINA. *Edin.* BALSAMUM COPAIBÆ. *Dub.* Copaiba Balsam.

Syn, Beaume de Copahu, (*F*) Kopaiva balsam, (*G.*) Balsamo del Coppaiba, (*I.*) Copayva, (*S.*)

The copaiva tree is a native of South America and the Spanish West India Islands. It grows in great plenty in the woods of Tolu, near Carthagena, and in those of Quito and Brasil. It is a lofty handsome tree, branching at the top, with a brownish ash-coloured bark. The leaves are large and pinnate, consisting of four pair of ovate-pointed, alternate, ferruginous leaflets with a terminal one, two or three inches long, entire, shining, veined, narrower on one side than on the other, and placed on short petioles. The flowers are in terminal racemes, which are stiff, spreading, the length of the pinnæ, and loosely divided into eight alternate common peduncles, with the flowers, which are white, sitting closely on them. The petals are oblong, acute, concave, spreading: the filaments slender, incurved, bearing oblong incumbent anthers; and the germen roundish, compressed, and on a short pedicel. The fruit is an oval, two-valved pod, containing a single egg-shaped seed enveloped with a berried arillus.

The copaiba balsam of the shops is procured by wounding, or boring these trees to the pith, near the base of the trunk, when it flows abundantly[1], in the form of a clear colourless liquid, which is thickened, and acquires a yellowish colour by age. The operation is performed two or three times in the same year; and from the older trees the best balsam is obtained. It is brought to this country from the Brazils in small casks, each of which contains from one cwt. to one cwt. and a half of the balsam.

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[1] *Observations, &c. on Purgative Medicines,* 8vo. *passim.*

Qualities. — Genuine good copaiba balsam has a peculiar but agreeable odour, and a bitterish hot nauseous taste. It is clear and transparent, its consistence is that of oil, the colour a pale golden yellow, and its specific gravity 0.950;[2] but when it is exposed with an extended surface to the action of the air, it gradually thickens, until at length it becomes solid, dry, and brittle like resin. It is insoluble in water, but is completely soluble in alcohol and ether. Sulphuric acid converts it into a brown bituminous-like mixture, which gives out a strong odour of sulphur. Nitric acid in the ordinary heat of the air partially dissolves it, and renders it brown; but at an increased temperature the action is violent, the acid is decomposed, and nitrous fumes are copiously emitted. The muriatic and acetic acids scarcely affect it. The pure alkalies form with it white saponaceous compounds, which are soluble in water, forming opaque milky mixtures. It is soluble also in the expressed oils. In destructive distillation it yields some empyreumatic brownish red oil, an acidulous water, carbonic acid gas, and olefiant gas, but does not yield benzoic acid. Hence it approaches nearer in its nature to turpentine than to the balsams.

Medical properties and uses. — Copaiba balsam is stimulant, diuretic, and gently purgative. It has been recommended in pulmonary complaints; but where the excitement is morbidly increased, or there is any degree of the inflammatory diathesis present, the heating and irritating quality of copaiba renders it injurious. From its power of stimulating the urethra it is more successfully used in gleets. It is equally efficacious in fluor albus, and in that state of the uterus sometimes occurring on the final cessation of the menstrual discharge, which is accompanied with a sanious discharge, great bearing down, and many of the symptoms of incipient cancer. It certainly affords considerable relief in hæmorrhoidal affections; perhaps from its exciting the steady peristaltic motion of the intestines, at the same time that the determination of the blood to the hæmorrhoidal vessels is lessened, by the stimulant effect of the remedy on the kidneys. In too large doses it excites inflammation of the kidneys; and its use should always be avoided when ulceration of these organs is suspected.

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[1] "Tanta quantitate distillat, ut spatio trium horarum ad lb. xij effundat." *Piso. Nat. Hist.* 56.

[2] The adulterated balsam, which Lewis mentions, as being thick, white, and opaque, with a quantity of turbid watery liquor at the bottom, is not now to be found.

The dose of copaiba is from ♏ x to ♏ xxx twice or thrice a day, either dropped on sugar, or mixed with soft or distilled water, by means of mucilage or the yolk of egg.

CORIANDRUM. *Spec. Plant. Willd.* i. 1448.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbellatæ.

G. 552. *Corolla* radiate. *Petals* inflex-emarginate. *Involucre* universal one-leafed. The partial ones halved.

Species 1. C. *sativum.*[1] Common Coriander. *Med. Bot. 2d ed.* 137. *t.* 53. *Smith Flor. Brit.* 320. *Eng. Bot.* 67.

Officinal. CORIANDRI SEMINA. *Lond.* CORIANDRI SATIVI SEMINA. *Edin.* CORIANDRUM. *Dub.* Coriander Seed.

Syn. Coriandre (*F.*) Koriander saamen (*G.*) Coriandro, (*I.*) Semilla de Culantro, (*S.*) D'hanya, (*H.*) D'amyáca, (*San.*)

This plant is an annual, a native of Italy; but is now found wild in some parts of this country[2], owing to the abundant cultivation of it for medicinal purposes. It flowers in June, and ripens its seed in August. The stem is erect, about two feet in height, branching, divaricated, round, smooth, and obscurely striated. The leaves are compound; the lower ones pinnated, with gashed, wedge-shaped, somewhat roundish leaflets, and the upper thrice-ternate, with linear-pointed segments. Both the umbels and umbellules are many-rayed; with an involucre of one linear leaf, and involucels of three lanceolate narrow leaves all on one side. The flowers are of a white or reddish colour. The calyx consists of five leaves: the petals are five also, oblong, and inflected at the tips, but those of the flowers of the circumference have the outermost petals larger, and not inflected. The fruit is globular, obscurely ribbed, and divisible into two concave hemispherical seeds; and this form of the fruit distinguishes Coriander from all the other species of Umbellatæ. The whole plant, when green, has an abominably fœtid odour if bruised; which extends even to the fruit.[3]

Qualities. — The dried seeds have a grateful aromatic odour, and a moderately warm, pungent taste; qualities which depend on an essential oil, that can be obtained separate by the distillation of the seeds with water. Their active principles are completely extracted by alcohol; but only partially by water.

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[1] Κοριαννον, Dioscoridis.

[2] About Ipswich, and some parts of Essex. *Smith.*

[3] Hence Alston imagined that the name of the plant comes from *κορις*, a bug. *Mat. Med.* ii. 349.

Medical properties and uses. — These seeds are carminative and stomachic. They are sometimes used in flatulencies; but principally to cover the unpleasant taste, and correct the griping quality of some cathartics. The dose is ℈j to ʒj, bruised.

CROCUS. *Spec. Plant. Willd.* i. 194.

Cl. 3. *Ord.* 1. Triandria Monogynia. *Nat. ord.* Ensatæ *Linn.* Irides *Juss.*

G. 92. *Corolla* six-parted, equal. *Stigma* convoluted.

Species 1. C. *sativus.*[1] Common Saffron. *Med. Bot. 2d edit.* 763. *t.* 259. *Smith Flora Brit.* i. 39. *Eng. Bot. t.* 343.

Officinal. CROCI STIGMATA. *Lond.* CROCI SATIVI STIGMATA. *Edin.* CROCUS. *Dub.* The Stigmas of the Saffron.

Syn. Saffran (*F.*) Safran (*G.*) Zafferano (*I.*) Azafran (*S.*)

Common saffron is a perennial, bulbous plant, found wild in some parts of this country, which affords reason for supposing it to be indigenous; but it is probable, that it was originally brought from Asia. It is cultivated for medicinal use, in great abundance, in Cambridgeshire and Essex. Formerly, it was chiefly grown at Saffron Waldon, but it is now confined to Stapleford. It flowers in September. The bulb is solid, and depressed. The flower, which appears before the leaves, is sessile on the bulb, of a violet or lilac colour, and raised on a long, slender white tube. The leaves are linear, a little revolute, of a deep rich green colour, with a white nerve in the centre; and inclosed with the tube of the flower in a membranous sheath. The corolla is parted into six nearly elliptical segments: the stamens are shorter than the corolla, and erect: and the style, which is the length of the corolla, hangs out at one side between the segments. The stigma is deeply three-parted, of a deep orange colour, and odorous; with the segments linear involute at the margin, and crenate at the apex.

For the preparation of the saffron, the flowers are gathered early in the morning, just as they are about to blow. They are then spread upon a table, and the stigmas, with a proportion of the style, carefully picked out of the flower, which is thrown away as useless. The stigmas are then dried upon a portable kiln, of a peculiar construction, over which a hair cloth is stretched, and over it several sheets of white paper are laid; upon which the wet saffron is spread between two and three inches thick. It is now covered with other sheets of paper; and over them is laid a coarse blanket five or six times doubled, which is pressed down with a board, and a large weight, after the fire is lighted. The first heat is strong, to make the saffron sweat; and after an hour, when it is found formed into a cake, it is turned, and the same degree of heat continued for another hour. The fire is then reduced to a moderate heat, which is kept up for twenty-four hours, during which time the cake is turned every half-hour so as to dry it thoroughly. It is then fit for the market.

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[1] Κροκος, Dioscoridis. Its English name is derived from the Arabic, Sapharan. *Celsus.* See *Alston's Lectures*, ii. 119.

In the shops is found saffron from Sicily, France, and Spain, besides the English. The Spanish is generally spoiled with oil, in which it is dipped with the intention of preserving it; the Sicilian and French are better; but the English, as being fresher, more genuine, and better cured, is always preferred. It is sometimes adulterated with fibres of smoked beef, the petals of the safflower (*Carthamus tinctorius*), and of officinal marigold (*Calendula officinalis*): or saffron, from which tincture or infusion has been drawn, is mixed with a little good saffron, and again pressed into a cake. These frauds are detected by infusing the suspected saffron in hot water; when the expanded stigmas will be easily distinguished from the petals of the other flowers; and the deficiency of colour and odour, or an unpleasant odour arising when the saffron is thrown upon red-hot coals, will indicate the presence of the other fraudulent ingredients. It should be chosen fresh, in close, tough, compact cakes, moderately moist; and possessing, in an obvious degree, all the undermentioned sensible qualities: the not staining the fingers, the making them oily: a musty flavour, and a whitish yellow, or blackish colour, indicate that it is bad, or too old.

Qualities.—Good saffron has a sweetish, penetrating, diffusive odour; a warm, pungent, bitterish taste; and a rich deep orange red colour. It yields its colour, and active ingredients to water, alcohol, proof spirit, wine, vinegar; and in a smaller degree to ether. By distillation with water it affords a small quantity of a heavy, golden yellow-coloured essential oil. The watery infusion which has the deep orange colour of the saffron, is rendered of a very deep purple by strong sulphuric acid, the mixture emitting the smell of vinegar, and yielding a copious black precipitate when diluted with water: the oxymuriatic acid produces a copious yellow precipitate, the liquid retaining only a pale lemon colour. Hence saffron seems to contain chiefly extractive, which, according to Hermbstadt, is nearly pure[1], and in the proportion of ten parts in sixteen of the vegetable; the remainder being chiefly ligneous fibre. I have found that it contains resin also; for sulphuric ether digested on saffron is coloured, and when evaporated on the surface of water, a pellicle of resin is left, whilst the coloured extractive, which is taken up with the resin, is dissolved in, and colours, the water.[1]

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[1] This extractive, when pure, is named polychroite, by Bouillon, Lagrange, and Vogel, on account of the different colours it is capable of assuming. Chlorine and light destroy its colour in the watery infusion; sulphuric acid changes it to indigo, which gradually becomes lilac; and nitric acid gives it a green hue. Vide *Ann. de Chim.* lxxx. p. 186.

Medical properties and uses.—Saffron is regarded as a stimulant and antispasmodic; but from the experiments of Dr. Alexander[2], its powers appear to be inconsiderable. It was known to the ancients, who considered it as a remedy of great activity; in moderate doses exhilarating the spirits, easing pain, and producing sleep; but occasioning headachs, coma, delirium, convulsive laughter, and even fatal effects, when given in large doses. In modern practice, however, it is scarcely ever given except as a cordial adjunct to more active remedies. The dose in substance is from grs. x. to ʒſs; but it has been given in much larger doses without any sensible effect being produced.

Officinal preparations. *Syrupus Croci.* L. *Tinctura Croci sativi.* E.

CROTON. *Spec. Plant. Willd.* iv. 531.

Cl. 21. *Ord.* 8. Monœcia Monadelphia. *Nat. Ord.* Tricoccæ *Linn.* Euphorbiæ *Juss.*

G. 1718. *Male.* *Calyx* cylindrical, five-toothed. *Corolla* five-petalled. *Stamens* 10—15.

Female. *Calyx* many-leaved. *Corolla* none. *Styles* three bifid. *Capsule* three-celled. *Seed* one.

Species 43. C. *Eluteria.*[3] Eleutheria. *Med. Bot. 2d edit.* 633. *t.* 223.

Officinal. CASCARILLÆ CORTEX.[4] *Lond. Dub.* CROTON ELEUTHERIÆ CORTEX. *Edin.* Cascarilla Bark.

This tree is a native of the Bahama Islands, and has been also found in Jamaica by Dr. Wright. It is a small tree, seldom exceeding twenty feet in height, and branching thickly towards the top. The more tender branches, when broken, ooze out a thick balsamic liquor. The leaves are alternate on short petioles, ovate or cordate, lanceolate, and elongated towards the apex which is blunt; entire, and on the upper surface of a bright green colour. The flowers are in axillary and terminal racemes. The petals are whitish, oblong, obtuse, and spreading. The male flower has ten subulate filaments, supporting erect compressed anthers: the female produces a roundish germen crowned with three bifid spreading styles, with obtuse stigmas. The capsule is superior, trilocular, containing a solitary shining seed.

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[1] Chemists assert, that extractive is insoluble in ether; but I find that when resin also is present in any vegetable matter, ether is capable of taking up some extractive combined with the resin which it dissolves; and when the ethereal tincture is evaporated on the surface of water, these principles are separated, the resin remaining in the form of a pellicle on its surface, whilst the extractive is dissolved, colours the water, and forms, with the solution of muriate of tin, a brown flaky precipitate. Hence ether is a good test of these vegetable principles.

[2] *Experimental Essays*, p. 88.

[3] It is the Clutia *Eluteria* of Linnæus.

[4] The London College erroneously refers this bark to the *Cascarilla* of Linnæus, the bark of which, however, has none of the sensible qualities of Cascarilla.

Cascarilla bark is imported chiefly from Eleutheria, one of the Bahama Islands, packed in chests and bales. It consists of pieces about six or eight inches long, scarcely one-tenth of an inch thick, quilled, and covered with a thin whitish epidermis.

Qualities.—Cascarilla bark has a pleasant spicy odour, and a bitter, warm, aromatic taste. The colour of the inside of the pieces is a reddish cinnamon hue, and their fracture close and short, of a dark reddish brown or purple colour. It is very inflammable, and is easily distinguished from all other barks by emitting, when burnt and extinguished, a fragrant smell resembling that of musk, but more agreeable. Its active constituents are partially extracted by alcohol and water, and completely by proof spirit. Ether takes up one and a half in ten parts; and, when evaporated on the surface of water, leaves a thick pellicle of bitter resin; and dissolved in the water, a small portion of almost colourless pungent extractive. According to Tromsdorff, who analysed it, 4696 parts yielded the following products:—Mucilage and bitter principle 864, resin 688, volatile oil 72, water 48, and woody fibre 3024 parts.[1] The ethereal tincture shows extractive also to be present, of a greenish yellow colour, very fragrant and pungent.

Medical properties and uses.—This bark is a valuable carminative and tonic. It was introduced into practice as such in 1690 by professor Stisser; and was afterwards much used in Germany, particularly by the Stahleans, as a substitute for cinchona bark; in the cure of intermittent and remittent fevers: but although they over-rated its virtues, yet, it is an excellent adjunct to the bark in these diseases; rendering it, by its aromatic qualities, more agreeable to the stomach, and increasing its powers. It is successfully employed in dyspepsia, asthma, and flatulent colic; the latter stage of dysentery, and diarrhœa, particularly when occurring after measles; and in the gangrenous thrush peculiar to children.[2] The dose of the powdered bark is from grs. xij to ʒſs, three or four times a day.

Officinal preparations. *Infusum Cascarillæ.* L. *Tinctura Cascarillæ.* L. D. *Extractum Cascarillæ.* D.

CUCUMIS. *Spec. Plant. Willd.* iv. 611.

Cl. 21. *Ord.* 8. Monœcia Monodelphia. *Nat. ord.* Cucurbitaceæ. *G.* 1741. *Male.* *Calyx* 5-toothed. *Corolla* 5-parted. *Filaments* 3.

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[1] *Annales de Chimie,* xxii. 219. and *Thomson's Chemistry,* 4th ed. v. 220.

[2] *Underwood, Diseases of Children,* 4th ed. i. 79.

Female. *Calyx* 5-toothed. *Corolla* 5-parted. *Pistil* three-cleft. Seeds of the *gourd* argute.

Sp. 1. C. *Colocynthis.*[1] Bitter Cucumber. *Med. Bot.* 2*d ed.* 189. *t.* 71.

Officinal. COLOCYNTHIDIS PULPA. *Lond.* CUCUMERIS COLOCYNTHIDIS PULPA. *Edin.* COLOCYNTHIS; FRUCTUS MEDULLA. *Dub.* The Pulp of Coloquintida, or Bitter Cucumber.

Syn. Coloquinte (*F.*) Koloquinthen (*G.*) Coloquintida (*I.*) Pepinero Coloquintida (*S.*) Hunzil (*Arab.*) Indráini (*H.*) Indraváruni (*San.*)

This plant is an annual, a native of Turkey, flowering from May till August, and much resembling the cucumber in its herbage. The root is branching, and strikes deep into the ground. The stems are trailing, beset with rough hairs: the leaves on long petioles, of a triangular form, variously sinuated, obtuse, of a fine green colour on the upper surface, and whitish and rough beneath. The flowers are solitary, axillary, and of a yellow colour. The calyx of the male flowers is bell-shaped: the corolla the same shape with the limb, divided into five pointed segments: and the anthers, which stand on three short filaments, are long, erect, and adhere together on the outer side. The female flower is like the male, but the filaments have no anthers. The fruit is a round berry or pepo, the size of a small orange, yellow, and smooth on the outside when ripe; trilocular, each cell containing many ovate compressed whitish seeds, enveloped by a white spongy pulp.

When the fruit is ripe and yellow, it is peeled and dried in a stove; and in this state it is brought to this country. When it is larger than a St. Michael's orange, and has black, acute pointed seeds, it is not good.

Qualities.—Dried coloquintida is inodorous; but has an extremely bitter nauseous taste, the pulp feeling mucilaginous when chewed. Independent of the seeds, it is altogether composed of a very light, easily torn, white, cellular matter. Ether, alcohol, and water extract its virtues. The infusion in boiling water has a golden yellow colour, gelatinises as it cools, and resembles, except in colour and taste, mucilage of quince seed. This mucilage is soluble in cold water. Alcohol and all the acids coagulate the solution, which is precipitated by solutions of acetate and superacetate of lead and nitrate of silver. Sulphate of iron strikes with it a deep olive colour. Its colour is rendered also greenish by solution of potash, which precipitates it; but the mucilage is dissolved by solution of ammonia. Ether digested on the pulp deposits, when evaporated on the surface of water, a white opaque bitter resin, and some extractive; from which the water acquires the bitter taste of the fruit, and precipitates solutions of potash, nitrate of silver, and acetate of lead. From these experiments colocynth pulp appears to consist chiefly of mucus, resin, the bitter principle, and some gallic acid.

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[1] Κολυκυνθις, Dioscoridis.

Medical properties and uses.—The pulp of this fruit is a very powerful drastic cathartic. It was employed by the ancients in dropsical, lethargic, and melancholic affections; but always with caution, on account of its violent effects. When given alone, even in moderate doses, it purges vehemently, producing violent gripings, bloody dejections, and not unfrequently convulsions and inflammation of the bowels. The watery decoction, or the infusion, is much less violent in its operation, and has been recommended in worm cases. It is scarcely ever given alone in any form, but is generally united with other purgatives to quicken their operation. The dose is from grs. iv. to grs. x. triturated with almonds, or gum, or some farinaceous matter.

Officinal preparations. *Extractum Colocynthidis.* L. *Extractum Colocynthidis compositum.* L. D. *Pilulæ Aloes cum Colocynthide.* D.

CUMINUM. *Spec. Plant. Willd.* i. 1440.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.
G. 547. *Fruit* ovate, striated. *Partial umbels* 4. *Involucre* 4-cleft.
Sp. 1. C. *Cyminum.*[1] Cumin. *Med. Bot. 2d edit.* 143. *t.* 56.
Officinal. CUMINI SEMINA. *Lond.* Cumin Seed.

Syn. Cumin (*F.*) Ramischer Kumel (*G.*) Semenza di Comino (*I.*) Semilla de Comino (*S.*) Kimoón (*Arab.*) Iirá (*H.*) Iiraca (*San.*)

This plant is an annual, a native of Egypt, but cultivated in great abundance in Sicily and Malta: whence the seeds are brought to this country. It flowers in June. It rises eight or ten inches in height, on a slender, round, often procumbent branching stem. The leaves are of a deep green colour, narrow, linear, and pointed: the flowers purple, in numerous four-rayed umbels; with umbellets having seldom more than four flowers. Both the involucres and involucels consist of three or four subulate unequal leaflets. The corolla is composed of five unequal petals, inflected, and notched at the apex: the filaments support simple anthers; and the germen is inferior, large, ovate, with two minute styles terminated by simple stigmas. The fruit consists of two oblong striated seeds united by their flat sides; of a pale brown colour, bristly on their convex surface.

Qualities.—Cumin seeds have a strong peculiar heavy odour, and a warm bitterish disagreeable taste. Water extracts little more than their odour; but alcohol takes up both odour and taste, and yields, when evaporated, an extract containing the sensible qualities of the seeds. In distillation with water, a large proportion of yellow pungent volatile oil comes over, which has the strong ungrateful odour of the seeds.

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[1] Κυμινον, Dioscoridis.

Medical properties and uses. — Cumin seeds are carminative and stomachic: but they are chiefly employed as an external stimulant in discussing indolent tumours.

Officinal preparation. *Emplastrum Cumini.* L.

CUPRUM. *Edin. Dub.* Copper.

Syn. Cuivre (*F.*) Kupfer (*G.*) Rame (*I.*) Cobre (*S.*) Nehass (*Arab.*) Tamba (*H.*) Tamra (*San.*)

Copper is a metal of a yellowish or brownish red colour, found very abundantly in many countries in both hemispheres of the globe. It is procured

A. In its metallic state:	
i. Crystallized.	Sp. 1. *Native copper.*
ii. Sulphuretted.	2. *Vitreous copper.*
a. and combined with iron.	3. *Purple copper.*
	4. *Gray copper.*
	5. *Copper pyrites.*
	6. *Black copper.*
b. ——— with iron and arsenic.	7. *White copper.*
B. United with oxygen:	
iii. Oxidized.	8. *Ruby copper.*
	9. *Tile-red copper.*
c. and combined with carbonic acid.	10. *Azure copper*, or *Mountain blue.*
	11. *Malachite.*
	12. *Emerald copper.*
d. ——— with arsenic acid.	13. *Octohedral arseniate of copper.*
	14. *Hexahedral arseniate of copper.*
	15. *Prismatic arseniate of copper.*
	16. *Trihedral arseniate of copper.*
	17. *Martial arseniate of copper.*
e. ——— with phosphoric acid.	18. *Phosphate of copper.*
f. ——— with muriatic acid.	19. *Sandy copper.*[1]

The sulphurets are the most abundant ores, and those from which copper is usually extracted. In Britain these are obtained chiefly in Cornwall.[2] The ore is first roasted to volatilize the sulphur, which is collected in chambers connected by flues with the kilns. It is then smelted, in contact with the fuel, in a large reverberatory furnace, to separate the iron; which being less fusible than the copper remains in the scoria, while the melted copper is drawn off through a plughole into earthen moulds. The copper, however, in this state is still very impure; and therefore it is remelted and granulated; and lastly refined, by being again melted with the addition of a little charcoal, which brings it to a state fit to bear the hammer, and to answer the various purposes of art.

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[1] Vide *Aikin's Chemical Dictionary*, art. *Copper.*

[2] The Parys mine in the isle of Anglesea is now nearly exhausted.

Pure copper has a yellowish red colour; is sonorous, ductile, malleable, tenacious; has a styptic disagreeable taste, and emits an unpleasant odour when rubbed. The specific gravity, when it is pure, and has been only fused, is 8.895. It has a granulated texture, and breaks with a hackly fracture; melts at a temperature equal to 27° of Wedgewood; is volatilized by a greater heat; and is oxidized, when heated in contact with atmospherical air, even at a temperature below that of ignition. When exposed to humidity and to air at the same time, it is tarnished, and a green crust is formed on its surface, which is a carbonate of copper.

Although copper in its metallic state was used as a remedy by the ancients, yet it is completely discarded from modern practice: and, notwithstanding so much has been said of its deleterious effects, there is every reason for believing that clean copper, when taken into the stomach, exerts no action whatever on the system. Two cases, of halfpence being swallowed by children, have come under my observation, in one of which the copper coin remained six months in the intestines, and in the other two months. Both were evacuated without having in the smallest degree injured the health, although the impressions were nearly effaced, and the metal much corroded. But poisoning from the use of copper utensils in cookery, arises either from the formation of the green carbonate, mentioned above, owing to the vessels not being well cleaned, and the food being allowed to stand for some time in the pan exposed to the air, after it is taken from the fire; or from the formation of verdegris, when vinegar used in making pickles, and other acid liquors, intended for internal use, are boiled in brass or copper vessels. The salts of copper thus formed are poisons, exciting inflammation of the stomach; and many fatal accidents have arisen from the practices which produce them, and from the equally dangerous mode of giving a fine green colour to vegetables by boiling halfpence with them; on which account copper utensils should be altogether banished from the kitchen, and also from the laboratory, where they are sometimes employed in making decoctions. The salts of copper may be detected in any suspected liquor, by placing in it a piece of clean polished iron, on which the copper is precipitated in a metallic state, or by dropping into it a solution of ammonia, which produces a beautiful blue colour, if any salt of copper be present. In cases of poisoning by any of the salts of copper, sugar is the best antidote.

The oxides of copper unite with acids, and form salts, which act very powerfully on the animal system; but of these the *subacetate* and the *sulphate* only are admitted into the list of materia medica.

1. SUBACETATE OF COPPER.

Officinal. ÆRUGO. *Lond. Dub.* SUBACETAS CUPRI. *Edin.* Verdegris, or Subacetate of Copper.

Syn. Vert de gris (*F.*) Grunspan (*G.*) Verdegrise (*I.*) Cardenillo (*S.*) Zunjar (*Arab.*) Pitrai (*H.*) Pitalata (*San.*)

This salt is principally manufactured in the south of France, at Montpellier, and Grenoble.[1] In the former place, the *marc* of the grape, that is, the cake which remains in the wine-press after the juice is expressed, composed of the husks and stalks, is moistened with water, or with wine if poor, and disposed so as to excite in it the acetous fermentation. When this takes place it is spread in jars between well-hammered plates of copper, heated over a pan of burning charcoal; a layer of fermented marc being placed between each plate of copper. The jars, each of which contains about 40 lbs. of copper, besides marc, are then loosely stopped with straw, and left at rest for ten, fifteen, or twenty days, at the end of which time the marc begins to whiten; and the copper is found to be covered with a green crust, interspersed with distinct silky green crystals. The plates are then moistened with water, and set up in racks, face to face, in a cellar: this is repeated once in seven days for six or eight times, until a thick coat of verdegris is formed, which is scraped off; and the copper plates again subjected to the same process till they are completely corroded. When the plates are first used the verdegris is apt to be black, unless their surfaces be previously rubbed with a solution of verdegris, which is suffered to dry before they are used.

Verdegris in this rough state is sold by the makers, who are generally women belonging to the wine-farms about Montpellier, to commissioners, by whom it is further prepared. After being well beaten in wooden mortars, it is pressed down in bags of white leather, a foot in depth and ten inches wide, in which it is dried in the sun; and thus a loaf of verdegris is formed, which cannot be pierced with a knife.

In this process the copper is oxidized, and the oxide combined with a small portion of acetic acid, forming a subacetate, which is mixed with vegetable extractive matter and the stalks and husks of grapes. The Grenoble verdegris is a purer subacetate, being prepared by simply disposing plates of copper in a proper situation, and repeatedly moistening them with distilled vinegar till the surface is oxidized and changed into verdegris.

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[1] Vide Chaptal's Account of the Manufacture, *Phil. Mag.* vol. iv. 71.

The subacetate of copper is imported into this country in the leather sacks, or bags, in which it is dried, each containing from fourteen to thirty pounds weight. But it is, also, now prepared in Great Britain.

Qualities. — Good subacetate of copper is inodorous. It seems at first nearly insipid, although exceedingly styptic; but leaves a strong metallic taste in the mouth. The mass is dry, not deliquescent, of a hard, pulverulent, foliaceous texture, and a beautiful blueish green colour. Distilled water at 60° dissolves 0·56 parts, while 0·44 remain in the state of a fine green powder, long suspended in the solution: that part which is dissolved is a superacetate of copper, the filtered solution reddening litmus paper; whilst the insoluble powder is a subacetate mixed with the impurities. When boiling water is used, the insoluble part is of a brown colour. Sulphuretted hydrogen gas decomposes the solution, precipitating a black sulphuret of copper. A small cylinder of phosphorus put into the solution is rapidly covered with a coat of metallic copper. According to Proust, verdegris consists of 43 parts of acetate of copper, 27 black oxide of copper, and 30 of water in intimate combination.

Besides the stalks and husks of grapes, verdegris is often adulterated with sand, and other earths. These are discovered by dissolving it in diluted sulphuric acid, which takes up the whole of the subacetate, and leaves the impurities. Or by boiling it in 12 or 13 times its weight of distilled vinegar, allowing the undissolved part to settle, and ascertaining its amount. The addition of muriate of barytes will detect any admixture of the sulphate or the tartrate.

Medical properties and uses. — Verdegris is tonic, and emetic. It has been used in epilepsy; and extolled as an emetic, in cases which require that the stomach should be quickly evacuated, without weakening it, as in incipient phthisis: but its internal exhibition is always dangerous, and to be avoided. It is, however, a useful detergent and escharotic application to foul ulcers, the callous edges of sores, and to consume fungus; but is seldom used, although milder than the sulphate. It is also used as a collyrium in chronic ophthalmia.

The dose of verdegris to produce its tonic effect is under gr.ſs.; and to operate as an emetic, from gr. j. to gr. ij. In overdoses it quickly proves fatal, acting both locally, and on the nervous system; and, on dissection, the coats of the stomach appear much thickened, and of a green colour. We formerly suggested the idea that fine filings of iron might precipitate the copper in its metallic state, and operate as an antidote: but this is now rendered unnecessary, as the experiments of Duval and others have proved that sugar is the antidote of cuprous poisons.[1]

Off. preparation. *Ærugo preparata.* D. *Ung. Subacetatis Cupri.* E.

2. SULPHATE OF COPPER.

Officinal. CUPRI SULPHAS. *Lond. Edin. Dub.* Sulphate of Copper.

Syn. Sulphate de cuivre, (*F.*) Schwefelsaures Kupfer, (*G.*) Vitriuolo blo, (*I.*) Caparosa (*S.*) Zungbar (*Arab.*) Tuteya, (*H.*) Tutt'ha (*San.*)

A considerable part of this salt, which is the blue vitriol of commerce, is obtained by evaporation from the water of some copper mines. Its origin is derived from the natural sulphurets of copper, which suffering a chemical change from exposure to a moist atmosphere, are converted into the sulphate, and washed down by the rain and other water of the [2]mines. It is also obtained by roasting copper pyrites, and exposing them to the action of air and moisture; in which case, as well as in the former, the compound is oxidized by attracting the oxygen of the surrounding atmosphere, at the same time that it changes the sulphur into sulphuric acid; so that by the gradual combination of these the sulphate is produced, and is then extracted by solution, and crystallized.

Qualities. — Sulphate of copper is inodorous, and has a very harsh, acrid, styptic taste. It is in semitransparent crystals, which undergo a slight degree of efflorescence when exposed to the air: their form is that of a rhomboidal prism; and their colour a deep rich blue. Its specific gravity is 2·1943: and, according to Chenevix, it consists of 42·6 parts of hydrate[3] of copper, 33·0 of acid, and 25·4 of water of crystallization.

Sulphate of copper is soluble in four parts of water at 60°, and less than two at 212°. The solution reddens litmus paper, showing an excess of acid. It is decomposed by the alkalies and alkaline carbonates, the sub-borate of soda, the acetate and superacetate of lead, and acetate of iron: and is precipitated by all the astringent vegetable infusions and tinctures, which are therefore incompatible in prescriptions with this salt.

Medical properties and uses. — Sulphate of copper is emetic, astringent, and tonic, when taken internally. With a view to its emetic effect it has been given in the early stage of phthisis, and where laudanum has been taken as a poison[4]; and, as an astringent and tonic, in alvine hæmorrhagies, intermittent fever, epilepsy, and some other spasmodic affections: but as the list of materia medica contains equally powerful and less injurious remedies, its internal exhibition ought to be altogether discontinued. Externally it is employed as an escharotic to consume fungus; and in solution as a stimulant to foul obstinate ulcers. Pledgets dipped in a weak solution of it are also, sometimes, used as a styptic in epistaxis, and other external hæmorrhagies, and a still weaker solution is a useful collyrium in some kinds of ophthalmia. It forms the base of a very unchemical preparation, Bate's *aqua camphorata*, which Mr. Ware recommends, diluted with sixteen parts of water, in the purulent ophthalmia of infants.

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[1] Vide *Traité des Poisons, &c.* par. P. M. Orfila, tome. i. p. 289.

[2] From this water at the Parys mine, a large supply of copper is obtained, by decomposing the sulphate, by throwing into the water old iron hoops.

[3] The hydrate consists of copper 25·6, oxygen 6·4, and water (which is intimately combined with the oxide) 10·6 parts. This water, as well as the water of crystallization, is expelled when the sulphate is decomposed by heat.

[4] See *Medico-Chirurgical Transactions*, vol. i.

As an emetic the dose is from grs. ij. to xv., in f℥ij of water; but as a tonic it should be given in the form of pill, beginning with gr. ¼, and gradually increasing the dose to grs. ij.

Officinal preparation. *Solutio Cupri Sulphatis composita.* E.

CURCUMA. *Roscoe, Linn Trans.* viii. 354.

Cl. 1. *Ord.* 1. Monandria Monogynia. *Nat. ord.* Scitamineæ *Linn.* Drymyrrhizæ *Juss.*

Gen. Char. Anther double, two-spurred. *Filament* petal-like, three-lobed, bearing the anther in the middle.

Sp. 1. C. *Zedoaria.*[1] Zedoary. Amomum Zedoaria. *Willd. Spec. Plant.* i. 7.

Officinal. ZEDOARIA RADIX. *Dub.* Zedoary root.

Syn. Zedoire (*F.*) Zedoar wurzel (*G.*) Zedoaria (*I.*) Judwar (*Arab.*) Nirbisi (*H. and San.*) Banhaldi (*Beng.*)

This plant is a perennial, a native of the East Indies, growing in sandy open places in Ceylon and Malabar, where it is named *Acua* by the Brahmins; and flowering in April and May. The root is tuberous, oblong, and about the thickness of a finger; the leaves are palmated, broad, lanceolate, subsessile on their sheath; seriaceous underneath; colour an uniform green[2]; and the scape, which rises from among them is naked, and terminated by a lax cylindrical truncated lateral spike of flowers.

The best zedoary root comes from Ceylon, in firm, short wrinkled pieces, of an ash colour externally. It should be heavy, and not worm-eaten.

Qualities.—The odour of zedoary root is fragrant, and somewhat like that of camphor, the taste biting, aromatic, and bitterish, with some degree of acrimony. The pieces break with a short close fracture, are pulverulent, and internally of a brownish red colour. Its active principles are partially extracted by water, and more completely by alcohol. In distillation with water, a heavy, greenish blue essential oil is obtained, which deposits camphor. It seems to contain, independent of its aromatic and bitter principles, a large proportion of fecula.

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[1] The excellent reasons given by Mr. Roscoe for separating this plant from the genus *Amomum*, induce me to prefer his authority to that of Willdenow in this instance.

[2] Roxburgh; vide *Asiatic Researches*, 8vo. vol. xi. p. 165.

Medical properties and uses.—This root is tonic and carminative. It was much employed by Avicenna, and the Arabians, in vomitings, colics, lientery, difficult menstruation, and as an antidote for venomous bites. It is certainly an agreeable stomachic, and useful in flatulent colic, but it is scarcely ever used by modern practitioners. The dose of the powdered root may be from grs. viij to ʒſs, two or three times a day.

CUSPARIA. Vide *Bonplandia Trifoliata.*

CYDONIÆ SEMINA. Vide *Pyrus Cydonia.*

DAPHNE.[1] *Spec. Plant. Willd.* ii. 415.

Cl. 8. *Ord.* 1. Octandria Monogynia. *Nat. ord.* Vepreculæ *Linn.* Thymelææ *Juss.*

G. 773. *Cal.* none. *Cor.* four-cleft, corollaceous, withering, inclosing the stamens. *Drupe* one-seeded.

* *Flowers lateral.*

Species 1. D. *Mezereum.* Common Mezereon. *Med. Bot.* iv. 716. *t.* 68. *Smith Flor. Brit.* 420.

Officinal. MEZEREI CORTEX *Lond.* DAPHNES MEZEREI CORTEX. *Edin.* RADICIS CORTEX. *Dub.*[2] The bark of the root.

Syn. Laureole gentile (*F.*) Kellerkals (*G.*) Mezereo (*I.*)

Mezereon grows wild in England and the north of Europe; but for medical use, and as an ornamental shrub, it is cultivated in gardens. Its flowers expand in March, before the leaves. It is a hardy plant, seldom exceeding four feet in height, with a strong woody branching stem, covered with a smooth pale olive-brown cuticle, and a tough fibrous inner bark. The root is of a fibrous texture, pale-coloured, with a smooth, olive-coloured bark: the leaves, which are protruded from the extremities of the branches, are tender, pale green, deciduous, lanceolate, sessile, entire, and smooth: the flowers are of a pale rose colour, odorous, surrounding the branches in clusters below where the leaves are sent off; they are sessile, two- three- and four-clustered, with deciduous bracteæ at the base of each cluster; monopetalous, tubular, and the lip divided into four oval spreading segments. The stamens are alternately shorter; the four higher ones diplaying their yellow anthers at the mouth of the tube: the germen is oval, supporting a flat stigma, on a very short style; and the fruit a red, pulpy drupe, containing one round seed. There is a variety of the mezereon with white flowers, and yellow fruit; but the medicinal effects of both are the same.

For medical use the roots are dug up in the autumn, after the leaves have fallen. The cuticle of the dried root is corrugated, and the inner bark has a white cotton-like appearance.

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[1] Δαφνη, Theophrastus, Dioscorides.

[2] The Dublin College, in its Pharmacopœia has quoted *Eng. Bot.* 119. erroneously the plate referred to being that of *Daphne Laureola*, Spurge Laurel.

Qualities.—The inner bark of every part of this plant, when fresh is very acrid, capable of producing inflammation, vesication, and a discharge of serum when applied to the skin; and when chewed excites a considerable heat of the mouth and fauces, which continues for many hours afterwards. The fruit is equally acrid, acting as a corrosive poison, if eaten. The bark retains its acrimony when dried. It yields its virtues to water and vinegar. By digesting the bark in alcohol, then evaporating the liquid to separate the resin, and diluting the residual fluid with water; filtering and adding acetate of lead, Vauquelin obtained a copious yellow precipitate, which, when freed from the lead, by means of sulphuretted hydrogen gas, he found to be a vegetable principle, sui generis. He has given it the name of *Daphnin.*[1]

Medical properties and uses.—It operates as a stimulating diaphoretic, increasing the general arterial action, and determining powerfully to the surface; but is apt to disorder the primæ viæ, and occasion vomiting and purging. It was long externally employed as a stimulus to ill-conditioned ulcers; and the recent bark macerated in vinegar, and applied to the skin, is recommended in France for producing and keeping up a serous discharge in chronic local affections. To form the issue, the bark must be renewed every night and morning; and afterwards once in twenty-four hours, to keep open the drain. Dr. Withering employed it successfully as a local stimulant in a case of difficulty of swallowing, occasioned by paralysis. Although the case was of three years' standing, the patient recovered the power of swallowing in about a month, by very frequently chewing thin slices of the root. For this purpose it should be sliced longitudinally, as the acrimony resides in the bark only, the woody fibre being nearly inert. Internally a decoction of this bark has been used against chronic rheumatism, scrofulous swellings, lepra, and some other cutaneous diseases; and till lately, it was considered as an anti-venereal remedy of great efficacy. The dose in substance is gr. j, to grs. x.

Officinal preparation. *Decoctum Daphnes Mezerei.* E.

DATURA. *Spec. Plant. Willd.* i. 1007.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Solanaceæ *Linn.* Solaneæ *Juss.*

G. 377. *Corolla* funnel-shaped, plaited. *Calyx* tubular, angled, deciduous. *Capsule* with four valves.

Species 2. D. *Stramonium.* Thorn Apple. *Med. Bot. 2d. edit.* 197. *t.* 74. *Smith. Flor. Brit.* 253.

Officinal. DATURÆ STRAMONII HERBA. *Edin.* STRAMONIUM;

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[1] *Ann. de Chim.* lxxxiv. p. 174.

HERBA. *Dub.* The herbaceous part of the Thorn Apple plant.

Syn. Pomme Epineuse (*F.*) Stechapfel (*G.*) Stramonio (*I.*)

This annual plant is a native of America, but is now naturalised to this country, and found growing on dunghills and by road-sides[1], from the fruit ejected from gardens; flowering in July and August. It rises about two feet in height, with a round stem, branching, and dichotomous above; spreading and leafy. The leaves, which spring from the forks of the stem on long round petioles, are large, of a dark green colour on the upper surface, and pale beneath, irregularly ovate-triangular in figure, sinuated, and unequal at the base. The flowers are large, axillary and solitary, on short erect peduncles. The calyx is about two inches in length, tubular, pentangular, and five-toothed: the corolla longer, of a white colour, funnel-shaped, and plaited; with the filaments, which support oblong flat anthers, adhering to the tube; and the style filiform, terminated with a thick club-shaped stigma. When the corolla and its included parts drop, the calyx also separates, except the base, which remains, and, becoming reflex, enlarges with the receptacle as a support to the fruit. The fruit is a large, fleshy, ovate-roundish, four-cornered capsule, beset with sharp awl-shaped spines; four-celled at the base, two-celled at the apex, and containing a great number of reniform compressed seeds. Both the leaves, capsule, and seeds are medicinally used.[2]

Qualities.—The whole herb has a narcotic, fœtid odour, producing head-ach, and a bitterish nauseous taste; and gives to the saliva a deep green tinge when chewed. According to Wedenberg[3], it contains gum (*mucus?*) and resin, a volatile matter (which I find to be carbonate of ammonia), and a narcotic principle. Its virtues are extracted both by water and alcohol. The watery infusion is transparent, with a very pale yellow hue, which is dissipated by acids, but very much deepened by the alkalies. It throws down whitish precipitates with acetate and superacetate of lead, and a black with nitrate of silver. Solution of sulphate of iron strikes a deep olive colour, and muriate of mercury renders it milky; but neither is precipitated till after a very considerable time.

Medical properties and uses.—Thorn apple is narcotic and stimulant. Baron Stoerck first recommended it as an internal remedy, in cases of mania and epilepsy; but, as Cullen remarks, he was less violent in his commendations of it than of the other narcotic plants which he introduced.[1] It was afterwards tried by other continental physicians with unequal success; particularly by Greding, who made the greatest number of trials of it. But the most decided experiments in its favour have been made by Dr. Barton of America, who regards it as a remedy of great efficacy. He found that when the dose of the dried herb was gradually increased to thirty grains, it dilated the pupil, and produced paralysis of the eye-lids; effects which were removed by a blister. Cataplasms of the bruised fresh leaves have been successfully used as an application to inflammatory tumours, and for discussing masses of indurated milk in the breasts of nurses: and an ointment made with the powdered leaves allays the pain of hæmorrhoids. Smoking the plant in the manner of tobacco, affords relief in the paroxysm of spasmodic asthma; a practice introduced into England from Ceylon. The inspissated expressed juice of the leaves has been usually given; and the extract has been lately found almost specific in severe chronic pains. The root is given by the native practitioners in the Carnatic, in violent head-achs. Hufeland recommends the form of tincture. The dose of the extract at first should not exceed grs. ss, twice a day; increasing the quantity gradually, until grs. xii. be taken in twenty-four hours.

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[1] Very common about London.

[2] According to Dr. W. Ainslie, this species of Datura is not found in India; but the D. *fustuosa* Dkétoora (*Hind.*) Dustura (*Sans.*) is well known and medicinally used. *Mat. Med. of Hindostan.* 4to. p. 42.

[3] *Dissertatio Medica de Stramonii Usu, &c.* Upsal. 4to.

Several instances of the fatal effects of stramonium, when eaten by mistake, are recorded by authors.[2] It produces delirium, stupor, convulsions, furious madness, paralysis, cold sweats, and death. As these effects depend on the narcotic principle, the best antidote is vinegar, after the stomach has been emptied.

DAUCUS. *Spec. Plant. Willd.* i. 1389.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbellatæ.

G. 53. *Cor.* somewhat rayed. *Flor.* of the disk abortive. *Fruit* hispid with hair.

Species 1. D. *Carota.*[3] Common Carrot. *Med. Bot. 2d edit.* 130. *t.* 50. *Smith Flora Brit.* 300.

Officinal. DAUCI (*hortensis*) RADIX. —— (*agrestis*) SEMINA. *Lond.* DAUCI CAROTÆ RADIX. *Edin.* DAUCUS SYLVESTRIS; SEMINA. *Dub.* The root of the cultivated Carrot, and the seed of Wild Carrot.

Syn. Carotte (*F.*) Karotte; Mohrrübe (*G.*) Carota (*I.*) Zanahoria (*S.*) Istufleen (*Arab.*) Gajer (*H.*) Garjara (*San.*)

The carrot is a biennial indigenous plant. In its wild state it is found abundantly in pastures and on hills[4]; flowering in

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[1] *Materia Medica*, ii. 281.

[2] It is said to be sometimes used by the Turks, instead of opium, or as a substitute for wine; and the Chinese infuse the seeds in beer. *Spratt's Hist. of the Roy. Soc.* 162.

[3] *Σταφυλινος αγριος*, Dioscoridis.

[4] We have seen it in great abundance on the range of chalk hills which overlook Ryegate in Surry.

June and July. It is cultivated for culinary purposes and feeding cattle. The root is spindle-shaped, fleshy, and of a yellow colour; throwing up a round furrowed stem, which rises about two feet in height, and sends off long, erect, naked, floriferous branches. The leaves are large, petiolated, thrice-pinnate, cleft, and hairy. The flowers are in many-rayed compound umbels, flat on the top, and spreading, but after the flowering season they become condensed in a concave form. The involucre consists of several narrow trifid leaves; the involucel is more commonly simple. The marginal flowers are white or yellow; the central, which are abortive, often of a dark blood colour. The seeds are in pairs, egg-shaped, convex, rough and bristled on one side, and flat on the other. These appearances are changed by cultivation. which also increases the size and the nutritious matter of the root.[1]

Qualities. — The sensible qualities of the *root* of the *cultivated carrot* are well known. It contains chiefly mucilage and sugar. The *seeds* of the *wild* variety have an aromatic odour, and a warm pungent taste; qualities depending on an essential oil, which may be separated by distillation with water.

Medical properties and uses. — The root of the garden carrot is emollient and antiseptic: and is successfully used when boiled and beaten to a pulp, as a poultice to correct the discharge of fœtid and ill-conditioned sores; and to allay the pain of carcinomatous and phagedenic ulcers. The seeds are carminative and diuretic; and hence useful in flatulent cases; but they possess no efficacy in gravel for which they have been extolled.[2]

The dose of the bruised seed is from ℈j to ʒj, or more.

DELPHINIUM. *Spec. Plant. Willd.* ii. 1226.

Cl. 13. *Ord.* 3. Polyandria Trigynia. *Nat. ord.* Multisiliquæ *Linn.* Ranunculaceæ *Juss.*

G. 1061. *Cal.* none. *Pet.* five. *Nect.* bifid, horned behind. *Pods* 3 or 1.

** *Three-capsuled.*

Spec. 13. D. *Staphisagria.*[3] Staves Acre. *Med. Bot.* *2d edit.* 471. *t.* 168.

Officinal. STAPHISAGRIÆ SEMINA. *Lond. Dub.* DELPHINII STAPHISAGRIÆ SEMINA. *Edin.* Staves Acre seeds.

Syn. Staphisagre, (*F.*) Stephanskraut laus kærner, (*G.*) Stafisagria, (*I.*) Piojenta, (*S.*)

This species of larkspur is a biennial plant, a native of the south of Europe, flowering from June to August. It is a handsome plant, from one to two feet in height, with a downy, erect, purplish, simple stem; and palmated leaves, the lobes of which are five or seven in number, of a pale green colour, oblong, ovate, and sometimes acutely indented. The flowers are of a blue or purplish colour, in an open terminal spike, and supported on long flower-stalks; the uppermost petal projected backwards so as to form a hollow spur, which encloses two spurs of the superior leaflets of the nectary. The filaments are about twenty and short, bearing large yellow anthers; the germens three, close together, tapering, downy, and crowned with short filiform styles, having simple stigmas. The seeds are rough, brown, triangular, and contained in straight oblong capsules. They are usually imported from Italy; for although the plant is occasionally reared in our gardens[1], yet it is difficult to preserve it through the winter, so as to enable it to perfect its seed.

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[1] Carrots are seldom sufficiently boiled; but when well boiled, they are very digestible and nutritious.

[2] The red central flowers of the umbels have been extolled in epilepsy.

[3] Σταφις αγρια, Dioscoridis.

Qualities.— Staves acre seeds have very little odour, but that little is disagreeable, their taste is bitter, acrid, and hot. They are yellowish within, and covered with a rough blackish cuticle. Their virtues are partially extracted by water, and completely by alcohol.

Medical properties and uses. — These seeds are emetic and cathartic; but their operation is so violent that they are never internally administered. Owing to their stimulating powerfully the salivary gland, when chewed, they have been used as a masticatory in toothach; but they are chiefly employed in powder, mixed with hair powder for destroying pediculi of the head.

DIANTHUS.[2] *Spec. Plant. Willd.* ii. 671.

Cl. 10. *Ord.* 2. Decandria Digynia. *Nat. Ord.* Caryophyllei *Linn.* Caryophylleæ *Juss.*

G. 893. *Calyx* cylindrical, one-leafed; with four scales at the base, *Petals* five, with claws. *Capsule* cylindrical, one-celled.

** *Flowers solitary, many on the same stem.*

Species 9. D. *Caryophyllus.* Clove Pink, or Gillyflower.

Med. Bot. 2d ed. 579. *t.* 205. *Smith Flor. Brit.* 461. *Eng. Bot.* 214.

Officinal. DIANTHI CARYOPHYLLI FLORES. *Edin.* CARYOPHYLLUM RUBRUM; FLORES. *Dub.* Flowers of the Clove Pink.

Syn. Giroflée musqúee, (*F.*) Gewürzhaft riechende Gartennelke (*G.*) Garofano, (*I.*) Clavel, (S.)

This is a perennial plant, a native of Italy, but found growing wild on ruined walls, as those of Rochester, Deal, and other old castles in England, flowering in July.[3] It is cultivated in gardens, for medicinal use; in which case the flowers become full, and improve their native odour. The root is firm, and fibrous. The stems, which rise from among tufts of channelled linear glaucous leaves, that are finely toothed a little above the base, but entire and smooth towards the apex, are erect, branched, and panicled, bearing many solitary flowers. The whole herb is glaucous. The calyx is striated, tubular, five-cleft, of a pale green colour, with four rhomboid, pointed scales at its base, about one-fourth of its length: the petals vary in colour from a pale flesh red to the deepest carnation; are unequally crenated, smooth at the orifice, with long narrow whitish claws. The stamens are often short and abortive; the styles long, recurved, and downy on the upper side.

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[1] It was first cultivated in England by Gerard in 1596.

[2] From Διος ανθος, The flower of Jove; yet it was unknown to the ancients.

[3] Ray and Hudson suppose it to be an outcast of gardens, and not an indigenous plant of England.

The varieties of this species of Dianthus produced by horticulturists are very numerous. For medicinal use those should be chosen which have the richest colour, and most spicy odour. The petals must be picked when the flower is fully blown.

Qualities — The odour of the petals is fragrant and aromatic, resembling that of the clove spice, the taste slightly bitter, and subastringent. Both water and alcohol extract their sensible qualities; and they yield an essential oil by distillation with water. The infusion strikes a black colour with sulphate of iron; acids redden its colour; and alkalies change it to green.

Medical properties and uses. — Notwithstanding the testimony of our forefathers in favour of the efficacy of these flowers in nervous affections, modern practitioners value them merely for their sensible qualities; and employ them only to give a pleasant flavour and fine colour to a syrup, which is a pleasant vehicle for the exhibition of more active medicines.

Officinal preparation. *Syrupus Dianthi Caryophylli.* E. D.

DIGITALIS. *Spec. Plant. Willd.* iii. 283.

Cl. 14. *Ord.* 2. Didynamia Angiospermia. *Nat. Ord.* Luridæ *Linn.* Scrophulariæ *Juss.*

G. 1155. *Cal.* five-parted. *Corolla* bell-shaped, five-cleft, bellying. *Capsule* ovate, 2-celled.

Spec. 1. D. *purpurea.* Purple Foxglove.[1] *Med. Bot. 2d edit.* 218. *t.* 78. *Smith Flora Brit.* 665. *Eng. Bot.* 1297. *Withering's Account of Foxglove.*

Officinal. DIGITALIS FOLIA. *Lond. Dub.* DIGITALIS PURPUREÆ FOLIA. *Edin.* Foxglove leaves.

Syn. Grande Digitalis (*F.*) Fingerhut (*G.*) Digitale Porporina (*I.*) Dedalera purpurea (*S.*)

Foxglove is an indigenous biennial plant, found growing generally on the sides of hills, or where the soil is dry, sandy or gravelly; flowering from the middle of June to nearly the middle of August. The root is knotty and fibrous, sending up an erect stem about four feet in height; round, downy, and leafy. The lower leaves are in tufts, large, about eight inches in length, and three in breadth, ovate and pointed, with bordered fleshy peduncles: the upper or stem leaves are alternate, sparse, and lanceolate; and both kinds have bluntly serrated,

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[1] It was named *Digitalis* by Fuchsius, the first author who notices its medical properties, from the German name Fingerhut, a finger stole.

nearly crenate, edges, and wrinkled velvety surfaces; with the upper surface of a beautiful deep green colour, and the under paler and more downy. The flowers, which are numerous, are attached on footstalks to one side of the upper part of the stem, so as to allow them to hang down, and form a very elegant terminal spike. At the base of each footstalk is a sessile pointed floral leaf. The uppermost segment of the calyx is narrower than the other four; thé corolla is monopetalous, of an oblong bell-shape, and about the size of the little finger of an ordinary glove; bellying on the lower side, with a short tubular base. The upper lip is slightly cloven, and more reflected than the under, which is larger. The corolla is guarded by long hairs at the mouth; its general colour is a bright pinkish purple, with the tube white, and the bellying part sprinkled on the inside with dark purple spots on a white ground, which give to the outside a speckled appearance. The filaments are white, curved, bearing large oval yellow anthers; the germen is pointed, supporting a simple style with the apex cloven. The seed-vessel, which is a pyramidal capsule with a double partition produced by the inflected margins of the valves[1], contains many small ferrugineous, punctated seeds.

The leaves are the parts of the plant medicinally used. They should be gathered when the plant is in flower, and those only which are fresh selected. "The leaf-stalks and midrib should be rejected, and the remaining part should be dried either in the sun-shine, or on a tin-pan or pewter dish before the fire, or the plant be hung up, each leaf separate, in a warm kitchen." Practitioners ought annually to obtain a supply of the recent leaves, in the month of July, and dry them themselves; as in the herb-shops they are often so ill dried as to appear black, in which state they are useless. The powder should be kept in closely stopped opaque phials.

Qualities. — Recent foxglove leaves are inodorous; but in the dried state they have a slight narcotic odour, and a bitter nauseous taste. Both water and alcohol extract their virtues. The watery infusion has a pale olive green colour, with the unpleasant odour and taste of the plant. It does not precipitate solutions of galls, tartarized antimony, nor sulphate of iron which only deepens its colour; but produces a yellowish precipitate with muriate of mercury, and a blackish violet very copious one with nitrate of silver. The dry powder, which should have a beautiful green colour, moistened and triturated with lime or calcined magnesia, and a glass rod dipped in muriatic acid held over it, exhibits copious white fumes, proving the presence of ammonia. The presence of ammonia is also apparent in the tincture; which is rendered milky by water.[1] Ten grains of the powder macerated in f ℥ſs of sulphuric ether lost three grains of its weight, and yielded all its colour to the ether; and the ethereal tincture, on being evaporated on water, left a pellicle of dark-green unctuous resinous matter, whilst some yellowish extractive was dissolved in the water, and precipitated afterwards by oxymuriatic acid. From this imperfect analysis, foxglove appears to contain ammonia, extractive, and a pea-green resinous matter in which its narcotic power resides.

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[1] *Gærtner de Fructibus, &c.* i. 247. *t.* 53. *f.* 6.

Medical properties and uses.—Digitalis is directly [2]sedative, and diuretic. It weakens the force of all the vital functions; and by a proper exhibition of it, the frequency of the pulse may be diminished any number of pulsations, and regulated at the pleasure of the practitioner; whilst at the same time it admits, to a certain extent, of the employment of such medicines as increase the firmness of the arterial action, and give tone to the habit. When given to the full extent of which the system can admit, the pulse intermits, and vertigo, indistinct vision, and nausea with vomiting, or purging, occur; and if after these indications the quantity be still increased, or if any considerable portion of the recent herb be inconsiderately swallowed, it produces delirium, hiccough, cold sweats, convulsions, syncope, and death. It is supposed, notwithstanding its sedative effects are acknowledged, to increase the action of the absorbent system; but although the discharge of urine is very considerably increased during its use, and the load of water with which the body is oppressed in dropsies be thrown off, yet, it is not easy to conceive how a direct sedative can operate as a stimulant; and therefore the modus operandi of foxglove, in producing its diuretic effect, may be regarded as still unexplained.[3]

As a *sedative* foxglove was early used in some acute diseases, but its powers were not understood. It is now efficaciously employed in inflammatory diseases; in active hæmorrhages, particularly from the uterine vessels, when the pulse is sharp, throbbing, and frequent; in mania; in scrofula; and in most cases of increased vascular action, or in which it is essential to lessen the usual impetus of the blood, as in aneurism.

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[1] Destouches, a French chemist, who analysed Foxglove, obtained also much carbonate of ammonia by distilling the aqueous extract. He obtained besides sulphate of potash and of lime, phosphate of lime, carbonates of lime, and of potash, and acetate of ammonia.

[2] This term implies, as I understand it, any substance which diminishes the action of the heart and arteries, without first increasing it.

[3] Dr. Baildon observed a curious effect of posture in ascertaining the real effects of digitalis on the pulse. When by gradually increased doses he took it to the extent of grs. vj. in the day, the pulse fell to 40 from 110. But when it was actually at 40, the erect posture would raise it to 100; when sitting it was 72, and when lying down 40. He observed the same effect in several patients to whom he gave it.—*Edin. Med. and Surgical Journal*, iii. 271.

Its beneficial effects in phthisis pulmonalis were known so early as 1710; and passing experience confirms the justness of the praises bestowed on it by a writer of that period.[1] Dr. Ferriar found its utility in this complaint much increased by combining it with myrrh and sulphate of iron.[2] Its use has also been extended to venereal ulcerations, chronic rheumatism, hooping-cough, and some spasmodic affections: and as an external application Hufeland recommends it to be used in the form of fomentation for dispelling glandular swellings.

As a *diuretic* the use of foxglove was introduced by Dr. Withering in 1775.[3] He found that its beneficial effects in dropsies were more certainly obtained in those constitutions in which there is a laxity of fibre, pale countenance, feeble intermitting pulse, and cold skin; and where the swelling easily pits. But in florid habits, with great strength, tense fibre, and a hot dry skin, its sedative effect is perceived, but no diuresis follows. "If the belly in ascites be tense, hard, and circumscribed; or the limbs in anasarca be solid and resisting, we have but little hope."[4] Experience has confirmed these judicious observations; and it is found that where this favourable state does not exist, it may be produced by bleeding, and the free use of neutral salts, calomel, and squill, all of which lower the system. The diuretic effect is checked when much nausea is present; and Withering says purging also checks it; but I have not found this to be the case. The kinds of dropsy in which its effects are most useful, are ascites, anasarca, hydrothorax, and that species of dropsy which succeeds parturition, where the legs and thighs swell, become pale and semitransparent, with pain in both groins. It has also been found of the greatest service when conjoined with nitrous acid, in the dropsy which occurs in broken-down constitutions, that have been long harassed by mercury.[5] Digitalis will not cure a dropsy attended with palsy, unsound viscera, or other complications of disease; but by allaying the urgency of the symptoms it gains time for other medicines to act. No benefit has hitherto been obtained from its use in hydatids, and hydrocephalus.

Foxglove is administered in substance, or in decoction, or the watery infusion, or in tincture (see *Preparations*). When given in substance, it is frequently combined with aromatics, soap, or ammoniacum; and most advantageously with calomel and opium, when it is required only to produce its diuretic effects. It is always proper to begin with a dose not exceeding gr. j. of the powdered leaves given in a pill, twice a day; and gradually to increase it till its effects are apparent either on the kidneys, the stomach, the pulse, or the bowels. The medicine must then be discontinued; but in dropsy it may be repeated again after an interval, if the whole of the water be not evacuated. During its use diluents are useful and necessary; and immediately it is discontinued the strength should be recruited by generous food, steel, and cordial tonics. The deleterious effects of an overdose are to be counteracted by cordials, as brandy, mint tea, and opium; and when these are not sufficient, by blisters.

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[1] Salmon. See *The Edin. Med. and Surg. Journal*, v. 303.

[2] *Essay on the Medical Properties of Digitalis.*

[3] He was induced to try it from finding it the active ingredient in a family receipt for the cure of dropsy, regarding which his opinion was asked.

[4] *Withering's Account, &c.* 189.

[5] *Carmichael on Diseases which have been confounded with Syphilis*, 4to. p. 53-6.

Officinal preparations. *Decoctum Digitalis.* D. *Infusum Digitalis.* L. E. *Tinctura Digitalis.* L. E. D.

DOLICHOS. *Spec. Plant. Willd.* iii. 1037.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. Ord.* Papilionaceæ *Linn.* Leguminosæ *Juss.*

G. 1349. At the base of the standard, two oblong parallel scales, compressing the wings underneath.

* *Twining.*

Sp. 16. D. *pruriens.* Cowhage. *Med. Bot.* 2d. *ed.* 422. *t.* 153. *Chamberlaine's Practical Treatise on the Efficacy of Stizolobium or Cowhage.*

Offi. DOLICHI PUBES. *Lond.* DOLICHI PRURIENTIS PUBES. *Edin.* DOLICHES SETÆ LEGUMINUM. *Dub.* The hairs of the Dolichos pod.

Syn. Kiwách (*H.*) Capicach'hu (*San.*)

This is a perennial climbing plant, a native of America, and the East and West Indies. In Bengal, where it is named *Cadjuct*, it flowers in the cool months from September to March. The root is fibrous; the stem herbaceous, cylindrical, voluble, climbing, and branching; with ternate leaves, on footstalks from six to fourteen inches long, given off alternately at the distance of a foot from each other. The central leaflet is rhomboidal, the two lateral ones oblique, and all of them smooth on the upper surface, and hairy beneath. The flowers are papilionaceous, of a blood colour, peduncled, in pendulous solitary spikes, which hang from the axillæ of the leaves. The fruit is a coriaceous pod about four or five inches long, curved like the letter *ſ*, thickly covered with bristly short brown hairs; and containing three or five oval, compressed seeds.

The pods we receive are brought from the West Indies. If incautiously touched, the spiculæ with which they are beset separate easily, and, sticking in the fingers, occasion the most intolerable itching.

Medical properties and uses.—The spiculæ of dolichos pods operate as a mechanical anthelmintic. They have been found particularly useful in expelling the round worm, *lumbricus teres*, the spiculæ irritating, and aiding its expulsion, and wounding it, without affecting the intestines. The best mode of preparing the remedy, is to dip the pods in syrup or molasses, and then, with a knife, to scrape off the hairs along with the syrup. When the mixture attains the thickness of honey, it is sufficiently impregnated with the hairs, and is fit for use.

The dose of this mixture, for a child of three or four years old, is a tea-spoonful, given in the morning for three days, and then followed by a brisk cathartic.

DORSTENIA. *Spec. Plant. Willd.* i. 682.

Cl. 4. *Ord.* 1. Tetrandria Monogynia. *Nat. Ord.* Scabridæ *Linn.* Urticæ *Juss.*

G. 244. *Receptacle* common, one-leafed, fleshy, in which solitary seeds are nestled (or placed in sockets without attachment.)

Spec. 5. D. *Contrajerva.* Contrayerva. *Med. Bot.* 2*d edit.* 705. 240.

Officinal. CONTRAJERVÆ RADIX. *Lond.* DORSTENIÆ CONTRAYERVÆ RADIX. *Edin.* Contrajerva Root.

Syn. Contrajerva (*F.*) Giftwurzel (*G.*) Contrajerva (*I.*) Contrahierba (*S.*)

This is a perennial plant, a native of Peru, Mexico, and some of the West India islands. The root is fusiform, knotty, and branching, compact, furnished with many rough fibres; externally of a brown colour, and internally whitish. It sends up several leaves, which are about four inches in length and the same in breadth; of an irregular shape, but in general deeply laciniated into five or seven obtuse parts; and placed on long radical footstalks, winged towards the leaves. The fructification, which is remarkable, and on radical stalks or scapes which rise about four inches high, is a fleshy receptacle, shaped like an animal placenta, about an inch long, and three-fourths of an inch broad, placed vertically: and containing on its upper surface very small, scarcely conspicuous flowers, situated closely together, immersed in the receptacle, and occupying the whole of its disc. The capsule possesses an elastic power when ripe, by which the seeds are thrown out with considerable force.

Monardus is the first author who mentions this root, which, he says, is called Contrajerva[1] by the Spanish Indians, on account of its alexipharmic qualities. Dr. Houston[2], however, asserted that the officinal contrajerva was the roots of two other species of Dorstenia, the D. *Houstonia* and D. *Drakena* of Willdenow; but the British Colleges follow the authority of Linnæus. It is brought to this country from the West Indies, packed in bales; in pieces of about two inches long.

Qualities.— Contrajerva root has a peculiar, but not unpleasant odour, and a bitterish, warm taste, leaving a pretty lasting impression on the tongue. It preserves its qualities when dried; and in the state of powder. Both water and alcohol, assisted by heat, extract its virtues. The watery decoction is of a dark brownish red colour, and exceedingly mucilaginous. — The alcoholic tincture reddens litmus paper, is not altered by a solution of sulphate of iron, but is precipitated by water.

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[1] The Spanish, for the English word *antidote* is *contrahiérba.*

[2] *Phil. Trans. No.* 421. *p.* 195.

Medical properties and uses. — This root is a stimulant sudorific and tonic. Huxham and Pringle first pointed it out as a remedy well suited to fevers of a typhoid type, and it is often employed in malignant eruptive diseases, dysentery, and in some kinds of diarrhœa. It is also useful in atonic gout, chronic rheumatism, and the fever attending dentition in weak infants.

The dose of the powdered root is from grs. v. to ʒj; but it is seldom used alone.

Officinal preparation. *Pulv. Contrajervæ compositus.* L.

DRYOBALANOPS. *Asiatick Researches*, vol. xii. p. 539.

Cl. 13. *Ord.* 1. Polyandria Monogynia. *Nat. Ord.* Guttiferæ *Juss.*

G. nova. *Calyx* one-leafed, permanent; enlarged into a gibbous cup, with five ligulate long scariose wings. *Corolla* five petalled. *Capsule* superior, one celled, three valved, seed solitary. *Embryo* inverse, without perisperm.

Species. D. *Camphora.* *Asiatick Res.* vol. xii. p. 539. *Plate* 4.

Officinal. CAMPHORA. *Lond. Edin.* CAMPHORA; RESINA. *Dub.* Camphor.

Syn. Camphre (*F.*) Der Kampfer (*G.*) Canfora (*I.*) Alcanfor (*S.*) Cafoor (*Arab.*) Carpoorum (*Tam.*) Carphura (*San.*)

That the Camphor brought to Europe, from the islands of Sumatra and Borneo, is not the product of the Laurus *Camphora*, was remarked by Kœmpfer[1]; but no accurate description has yet been given of the tree which yields it. Mr. H. T. Colebroke has, however, lately been enabled to determine the genus to which it belongs, and to which we have referred it, from the examination of some seeds in a very perfect state, sent from Tapanooly to Calcutta.

The Dryobalanops *Camphora* is a native of forests on the north-western coast of Sumatra: and especially in the vicinity of Tapanooly. It is stated by Mr. Prince to be found in abundance from the back of Ayer Bongey, as far north as Bacougan, a distance of 250 miles. It grows to a great height, and the *trunk*, which is arboreous and covered with a brownish bark, often measures six or seven feet in diameter. The *leaves* are opposite below and alternate above, elliptical, obtusely acuminate, or rather beaked, parallel veined, entire, smooth; 3.7 inches long, 1.2 broad, and supported on short *petioles*; with subulate, caducous *stipules* in pairs. The *perianth* is a one-leafed, five-parted, persistent capsule, which is superior, ovate, woody, fibrous, longitudinally furrowed, embraced at the base by the calycine hemispherical cup, and surrounded by its enlarged leaflets, which are converted into remote, foliacious, spatulate, rigid, reflex wings; one-celled and three-valved. The seed is solitary, conforming to the cavity of the capsule; and has a strong terebinthinate fragrance.

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[1] "Camphoram naturalem et crystallinam perquam pretiosam ac rarum impertitur arbor in Sumatra et Borneo insulis. Sed hæc arbor ex Daphneo sanguine non est." *Amœn. Exot.* p. 773.

The Camphor forms in the heart of the tree, occupying portions of a foot and a foot and a half long, at certain distances; but the younger trees yield oil only, which has nearly the same properties as the camphor, and would ultimately be converted into the concrete substance. The natives, in searching for the camphor, make a deep incision in the trunk, about 14 or 18 feet from the ground, with a *billing* or Malay axe; and when it is discovered they fell the tree, and cut it into junks of a fathom long, which are again split. The camphor is found in a concrete state, and resembles whitish flakes in perpendicular layers, occupying a space the thickness of a man's[1] arm. A middling sized tree will yield nearly eleven pounds, and a large tree double that quantity.

For the *qualities* and *medical properties* of *Camphor.* See Laurus *Camphora.*

ELETTARIA. *Maton, Trans. of the Linnean Society, vol. x. part. 2d.*

Cl. 1. *Ord.* 1. Monandria Monogynia. *Nat. ord.* Scitamineæ *Linn.*

Spec. E. *Cardamomum.* The Cardamom Elettaria. *Van Rheede,* (Elettari.) *Hort. Malabar.* vol. ix. *t.* 4, 5. *Linnean Trans.* vol. x. part 2d. *Roxburgh. Ind.* p. 3. N. 226. *Asiatick Res.* v. xi. p. 355.

Officinal. CARDAMOMI SEMINA. *Lond.* AMOMI REPENTIS SEMINA. *Edin.* CARDAMOMUM MINUS; SEMINA. *Dub.* Lesser Cardamom Seeds.

Syn. Petit Cardamome (*F.*) Kleine Kardamomen (*G.*) Amomo minore (*I.*) Kákulah, Hal (*Arab.*) Purbi and Guzrate Cláchi (*H.*) Elá (*San.*)

The plant which produces these seeds is a native of India, growing on the mountains above Cochin and Calicut; in shady places on the declivities, and in the valleys. The cultivated plant does not flower till it is four years old. It rises twelve feet in height. The root is oblong, jointed, tortuous, of a whitish colour, and sending off numerous fibres. The stems which emerge from the root are simple stripes, like a reed, round, smooth, and the thickness of the human thumb. The leaves are alternate and sheathing, about four spans in length; broad, green, and striated with parallel veins; and have a strong subacrid, aromatic taste and odour. The midrib of the leaf on the upper surface is pale green; on the under a much deeper green.

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[1] The camphor thus found, is called by the natives *Se Tantong.*

The flowers are in racemes which are sent off from the root, and creep along the ground: and are furnished with oblong leaflets like capsules. The calyx is monophyllous, inferior, small, and divided into three obtuse teeth at the margin: the corolla is monopetalous, tubular, and four-cleft; the three outer segments being long, narrow, and of a straw colour, and the central one large, broad, concave, and irregularly oval. The filament is broad, slightly grooved, supporting a large, double, emarginate, crestless anther, having a deep fissure between its lobes, to receive the style, which is slender, and bearing a funnel-shaped ciliated stigma. The capsule is berried, and trilocular.

The ripe fruit is gathered in November; and the capsules, which are dried over a gentle and slow fire, as they dry change from green to a whitish straw colour, and become thinner in the bark: whilst the permanent calyx and foot-stalk is detached by rubbing them between the hands.[1]

Three species of this genus are known; but that which is above described yields the officinal cardamoms. They are brought to this country in the Bengal ships in cases, each containing about 120lbs. weight. For the purpose of preserving them, they are kept in the capsules, which are small, triangular, striated, and of a pale, clear, straw colour.

Qualities.—Cardamom seeds have an agreeable aromatic odour, and warm spicy taste. They are easily separated from the capsule; and are of a brown colour, angular, corrugated, and pulverulent. Water, alcohol, and ether extract their virtues; the two latter most completely. The watery infusion has a turbid appearance; and lets fall a flocculent precipitate, on the addition of alcohol, the acids, solutions of sulphate of iron, muriate of mercury, and acetate of lead: but the sulphate of iron does not alter its colour. The alchoholic tincture is rendered milky by water. The ethereal has a yellowish green hue, and, when evaporated on the surface of water, leaves neither resin nor extractive, but a considerable portion of essential oil, which has the flavour and taste of the seeds in perfection. Cardamoms therefore seem to be entirely composed of fecula, mucus, and essential oil.

Medical properties and uses.—Cardamom seeds are carminative and stomachic. They are less stimulating than pepper, and are, therefore, used, united with rhubarb and magnesia, in the flatulent colic of children; and as a grateful addition to bitters in dyspepsia, and gouty affections of the stomach: but they are principally employed to give warmth to other remedies.

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[1] In gathering the fruit, the fruit panicles are plucked up by the roots; the pods then stripped through the fingers, and sorted into three classes: 1. Valli Kai, or head fruit; 2. Nadu Kai, middle fruit; 3. Poulo Kai, abortive fruit. *Linn. Trans.* x. p. 229.

The dose in powder is from grs. vj. to ℈j.

Officinal preparations. *Extractum Colocynthidis compositum.* L. D. *Tinctura Cardamomi.* L. E. D. *Tinctura Cardamomi composita.* L.D.

ERYNGIUM. *Spec. Plant. Willd.* i. 1356.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbellatæ.

G. 518. *Flowers* capitate. *Receptacle* paleaceous.

Spec. 6. E. *maritimum.* Sea Eryngo, or Holly. *Med. Bot. 2d ed.* 120. *t.* 46. *Smith Flora. Brit.* 289. *Eng. Bot.* 718.

Officinal. ERYNGIUM; RADIX. *Dub.* Eryngo Root.

Syn. Panicaut commun (*F.*) Eringio (*I.*) Eryngo (*S.*)

The sea holly is an indigenous perennial plant, growing abundantly on the sea shores, and flowering in July and August. The root is long, and creeping; sending up an erect, branching, round, obscurely furrowed, and leafy stem, nearly eighteen inches in height. The lower leaves are reniform, plaited, lobed, and petiolate; those of the stem are sessile; and the whole are smooth, rigid, toothed with sharp spines like those of the holly; and of a pale glaucous colour, with the nerves and spines white. The flower heads are terminal, conical, and supplied with paleæ; with an involucre of many, spreading, pointed leaves. The paleæ, which separate the florets, are tricuspid, longer than the florets, and spinous. The teeth of the calyx are erect, and spinous; the corolla consists of five oblong blue petals, with inflected points. The filaments are longer than the corolla, the styles are filiform with simple stigmas; and the germen inferior and beset with hairs, becoming two oblong connected seeds.

The root should be dug up for use, when the seed is ripe in autumn. It is white internally, and covered with a brown cuticle.

Qualities.—The root of eryngo has scarcely any odour; and only a soft sweetish, slightly aromatic taste. Its virtues are extracted by water.

Medical properties and uses.—It is supposed to be diuretic and aperient: and has been recommended in gonorrhea, jaundice, and visceral obstructions; but it is an inert useless substance; and might with propriety be altogether rejected from the list of materia medica.

EUGENIA.[1] *Spec. Plant. Willd.* ii. 959.

Cl. 12. *Ord.* 1. Icosandria Monogynia. *Nat. Ord.* Hesperidiæ *Linn.* Myrti *Juss.*

G. 972. *Calyx* four-parted, superior. *Petals* four. *Berry* one-celled, one-seeded.

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[1] This genus was named after Prince Eugene of Savoy.

Sp. 24. E. *caryophyllata.* The Clove-tree. *Med. Bot. 2d edit.* 538. *t.* 193. *Journal de Physique, tome* xiv. 47. *t.* 1.

Officinal. CARYOPHYLLI. CARYOPHYLLI OLEUM. *Lond.* CARYOPHYLLUS AROMATICUS. *Floris germen, et ejus Oleum volatile. Edin.* CARYOPHYLLUS AROMATICA; CALYX, OLEUM ESSENTIALE. *Dub.* Cloves, and Oil of Cloves.

Syn. Cloves. Clousele Girofles (*F.*) Gewürz-nelken (*G.*) Garofano (*I.*) Clavo de especia (*S.*) Kerunful (*Arab.*) Laung (*H.*) Lavanga (*San.*) *The oil.*—Huile de Girofle (*F.*) Nelkenöhl (*G.*) Olio di Garofano (*I.*) Azeyte de Clavos (*S.*)

The clove-tree is a native of the Moluccas, where it was originally abundantly found, particularly at Machian; but the narrow policy of the Dutch led them to destroy almost all the trees except those which they cultivated on the islands of Amboyna, Honimoa, Oma, and Noussalant, so as to give them a monopoly of the trade, which they have held since 1638. The French however obtained some plants which they carried to the Isle of France, in 1770, and thence, in 1774, to Cayenne. In 1789 it was also introduced into the island of Dominica by William Urban Buée, esq.; and at all these places it is now cultivated. It is a handsome tall tree, rising upon a stem of very hard wood, covered with a grayish smooth bark; and about four or five feet in height before it branches. The leaves are oblong, lanceolate, and pointed at both ends; firm, with many parallel nerves, on each side of the midrib, entire, sinuated, and supported on brown petioles about half the length of the leaf. The colour of the leaves is dull green, and when bruised their odour is strong, and aromatic. Its flowers are in terminal bunches, or corymbose panicles, which generally consist of 9, 15, or 21 flowers. The calyx is oblong, woody, and divided at the brim into four small, toothed segments. The corolla consists of four, roundish, notched, small petals; inclosing many slender filaments inserted into the calyx, bearing simple anthers. The germen is oblong with a simple style: the fruit an inferior, coriaceous, bilocular berry.

Although the unopened flowers of this tree, and even the leaves, particularly their petioles, are extremely aromatic and odorous, yet the flowers are inodorous when they are fully blown; and the real fruit is not aromatic.[1] The cloves are the unexpanded flowers, which are first obtained when the tree is six years old. At Amboyna they are collected from October to December, when they begin to redden. They require to be dried quickly; on which account they are first immersed in boiling water, then exposed to smoke and a heat of 120° Fahr till they begin to assume a brown hue; and afterwards the drying is finished in the sun. In the West Indies, those cloves which are dried altogether in the sun are considered the best.

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[1] *Journal de Physique,* l. c.

Cloves are imported into this country from the Dutch settlements; the best in chests, and an inferior kind in bags. The oil is brought in bottles; but a considerable quantity is drawn in this country. The best variety of the Amboyna cloves is smaller and blacker than the other varieties, very scarce, and as a mark of pre-eminence is named the Royal clove. The Dutch sometimes mix among the best cloves, those from which the oil has been drawn; and the fraud is not easily discovered, as the used cloves regain part of their flavour by this mixture. The oil is also much adulterated: when it has a hot, fiery taste, and a great depth of colour, it may be suspected.

Qualities.—Good *cloves* have a strong, fragrant, aromatic odour, and a hot, acrid, aromatic taste, which is very permanent. In form they resemble a small nail, scarcely exceeding half an inch in length; with a roundish conical head, and directly under it four sharp, spreading points, concave above. Their colour is deep reddish brown; the conical part of the head being lighter, and yellowish; and this part is very easily separated. To the touch they feel somewhat greasy. Water extracts their odour, but little of their taste: alcohol takes up both; and when evaporated, the extract is pungent and fiery, without any odour. Ether extracts completely their sensible qualities; and when the tincture is evaporated on water, a considerable portion of a very pungent hot unctuous resin, and some extractive remain.

Cloves yield by distillation in water one-sixth of their weight of a heavy, nearly colourless oil, which becomes yellow by age. It has the flavour of the cloves, but is comparatively milder. The Dutch oil is deeper, and of a reddish colour; and is extremely pungent and fiery: owing, it is supposed, to its containing in solution some of the resin of the cloves extracted by alcohol.

Medical properties and uses.—Cloves are stimulant in a greater degree than any of the other aromatics. They are sometimes given alone in dyspepsia, attended with a very languid state of the circulation, and a sense of coldness in the stomach; and in atonic gout: but they are chiefly used as corrigents to other medicines. The *oil* is used as a corrigent to griping extracts; and sometimes as a local application in tooth-ach. The dose of powdered cloves may be from grs. v. to grs. x; that of the oil, ♏ ij. to ♏ vi. triturated with sugar.

Officinal preparations. *Infusum Caryophyllorum.* L.

EUPHORBIA.[1] *Spec. Plant. Willd.* ii. 881.

Cl. 11. *Ord.* 3. Dodecandria Trigynia. *Nat. Ord.* Tricoccæ *Linn.* Euphorbiæ *Juss.*

G. 959. *Corolla* four, or five-petalled, fixed to the calyx. *Calyx* one-leafed, ventricose. *Capsule* tricoccous.

Species 7. E. *Officinarum*. Officinal Euphorbium Plant. *Amœnit. Acad.* v. iii. *p.* 102. *Jackson's Morocco, p.* 81. *fig.?* *Bruce's Abyssinia,* v. v. *p.* 41. *fig.?*

Officinal. EUPHORBIÆ GUMMI-RESINA. *Lond.* Euphorbium.

Syn. Euphorbe (*F.*) Euphorbium (*G.*) Euforbio (*I.*) Euphorbio (*S.*) Saynd kadood (*H.*) Ukcil Nefsch (*Arab.*)

This is a perennial, succulent, shrubby plant, a native of Africa, where it grows in great abundance. The plant described and figured by Bruce under the name of *Koll-Quall*, and that which Jackson, in his Account of Morocco, says, the Arabs and Shellahs call *Dergmusc*, appear to be the same, or varieties of the E. *Officinarum*. When arrived at maturity, it has a simple, erect, round stem, about five feet high; angled or furrowed with 18 or more longitudinal fissures. From the summit branches are thrown out in every direction, going off first horizontally, and then ascending, so as to give to the whole plant the appearance of the skeleton of a large goblet supported on a stalk or foot. The branches are about an inch in diameter, more distinctly angled than the stem, scolloped, and furnished with prickles every where double. It has no leaves, but instead of them tubercles adjoining to each pair of prickles. The flowers are sessile, on the extremities of the branches, of a crimson colour. The calyx is of one piece, persistent, with a 4 or 5 toothed lip: the petals are 4, turbinated, gibbous, thick, truncated, unequal in situation, and fixed by claws to the margin of the calyx. The filaments are more than 12, thread-like, longer than the corolla, coming forth at different times, and carrying each two globular anthers; the germen is trigonous, with a simple, short style crowned with three semibifid obtuse stigmas. The capsule is tricoccous, pedicellated, elastic: with round solitary seeds.

The succus proprius of all the species of euphorbia is white, and concretes by exposure to the air into a solid substance. The euphorbium brought to this country is said to be the product of some other species, besides the plant we have described; for instance, E. *antiquorum* and E. *canariensis* of Willdenow. Mr. Jackson says that in the lower regions of Mount Atlas the inhabitants collect the concreted gum resin, which they call

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[1] Antonius Musa and Euphorbus were brothers; the former was physician to Augustus Cæsar, the latter to Juba, king of Libya. Cæsar raised a statue to Musa; Juba named this plant after Euphorbus. "Ubi Jam Musæ statua? Periit! evanuit! Euphorbii autem perdurat, perennat, nec unquam destrui potest." *Crit. Bot.* 86.

furbiune, in September. It is obtained by making slight incisions in the branches of the plant with a knife, from which a milk-like juice exudes, and forms into tears of an oblong or roundish form. The quantity yielded is so considerable that the plants are cut once only in four years; the supply then obtained being sufficient for that space of time for all Europe.—The recent juice is so corrosive as to erode the skin wherever it touches; and the people who gather the gum are obliged to tie a cloth over their mouth and nostrils, to protect them from the acrid dust of the withered branches, which induces the most violent sneezing.[1]

Euphorbium is imported in serons, each of which contains from 100 to 150 lbs. weight. It is in small hollow somewhat forked pieces, which appear as if the euphorbium had concreted round the pedicels of the flowers; and it is often mixed with the tricoccous seeds, and other impurities.

Qualities.—It is inodorous; and, when first chewed, has little taste, but it soon gives a very acrid burning impression to the tongue, palate and throat, which is very permanent and almost insupportable. Water when triturated with it is rendered milky, but actually dissolves 1-7th part only of the quantity employed: alcohol dissolves 1-4th part, and affords a clear straw-coloured tincture, which is rendered milky by the addition of water: ether takes up six parts in ten, forming an opaline infusion. When the ethereal tincture is evaporated on water, it leaves on the side of the glass a pellicle of transparent resin, and on the water a cake of opaque adhesive whitish matter, which I found to consist of wax and resin, resembling an officinal plaster; while the water is rendered milky. The acrimony resides in the resinous matter. The analysis of Braconnot[2] makes 100 parts of euphorbium to contain 37·0 of resin, 19·0 wax, 20·5 malate of lime, which was mistaken for gum, 2·0 malate of potass, 5·0 water, 13·5 woody matter, and 3·0 loss. He regards the resin as peculiar, from its being insoluble in alkalies, but soluble in the sulphuric and nitric acids.

Medical properties and uses.—Euphorbium possesses powerful carthartic, emetic, errhine, and rubefacient properties. It has been given as a hydragogue in dropsies; but owing to the violence of its effects its internal use is now exploded: neither as an errhine can it be used alone, for it occasions so much inflammation as to produce hæmorrhage from the nostrils, and swell the integuments of the head. When properly diluted however, with starch or any other inert powder, and cautiously used, it is an effectual and excellent errhine in lethargy, deafness, palsy, amaurosis, and similar cases.

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[1] Bruce says, "When the tree (Kol-Quall) grows old, the branches wither, and, in place of milk, the inside appears to be full of powder, which is so pungent, that the small dust which I drew upon striking a withered branch seemed to threaten to make me sneeze to death, and the touching of the milk with my fingers excoriated them as if scalded with boiling water."—*Appendix*, 4to. p. 43.

[2] *Annales de Chimie*, lxviii. 44.

FERRUM. Iron.

Syn. Fer, (*F.*) Ferro (*I.*) Eissen, (*G.*) Hierro, (*S.*) Loha, (*H.*) Ayas, (*San.*)

This metal is one of the most abundant metallic productions of Nature. Its ores are found in almost every part of the globe; in the soil, and often in the water; and as a constituent of vegetable and animal bodies. Iron is procured:

A. In its metallic state:		
i. Alloyed with lead and copper.	Sp. 1. *Native iron.*	
——— with nickel.	2. *Meteoric iron masses.*	
ii. Sulphuretted.	3. *Iron pyrites.* Var.	*a.* Common.
		b. Radiated.
		c. Hepatic.
		d. Capillary.
		e. Cellular.
	4. *Magnetic Pyrites.*	
B. United with oxygen:		
iii. Oxidized.	5. *Magnetic iron stone.* Var.	*a.* Common.
		b. Iron sand.
	6. *Spicular iron ore.* Var.	*a.* Common.
		b. Micaceous
	7. *Red iron stone.* Var.	*a.* Red scaly iron ore.
		b. Red ochre.
		c. Compact.
		d. Red hæmatite.
	8. *Brown iron stone.* Var.	*a.* Brown scaly.
		b. Ochrey.
		c. Compact.
		d. Bn. hæmatite.
		e. Spathose.
	9. *Sparry iron ore.*	
	10. *Black iron stone.* Var.	*a.* Compact.
		b. Blk. hæmatite.
	11. *Yenite.*	
	12. *Argillaceous iron stone.* Var.	*a.* Red Chalk.
		b. Columnar.
		c. Lenticular.
		d. Jaspery.
		e. Common.
		f. Reniform.
		g. Pisiform.
	13. *Bog iron ore.* Var.	*a.* Morass ore.
		b. Swamp.
		c. Meadow ore.

C. Acidified:

iv. with carbonic acid.	14. *Carbonate of iron.*
v. phosphoric acid.	15. *Phosphate of iron.*
	16. *Blue iron earth.*
	17. *Phosphate of iron and manganese.*
vi. arsenic acid.	18. *Arseniate of iron.*
	19. *Arseniate of iron and copper.*
vii. sulphuric acid.	20. *Sulphate.*
viii. Composition unknown.	21. *Green iron earth.* Var. *a.* Friable. *b.* Coherent.

Metallic iron can be extracted from all of these ores, but the oxides are those more commonly wrought; and, in this country, the argillaceous iron stone and the red hæmatite are the kinds in general use. The process varies in different places, but the principles on which it is conducted are every where the same. The ore is first roasted by placing it, after it is broken into small pieces, in alternate strata with small coal, either in a kiln, or built up in a pyramidal form on the ground, and setting fire to the lowest stratum of coal. This part of the process expels any sulphur, water, or carbonic acid, with which the ore may be combined; and it is then smelted with coke in a conical furnace of the strongest masonry; the heat being raised to a very high degree by passing a blast of condensed air through the furnace, and to facilitate the separation of the melted metal, lime is used, as a flux. The scoria are drawn out through an opening towards the bottom of the furnace; and the melted metal, which is collected in a cavity at the bottom, is run off into moulds. In this state it is called pig, or cast-iron: and requires to be again fused and submitted to the action of the hammer, or passed between rollers, before it is sufficiently pure either for the majority of the purposes of art or of medicine.

Pure forged or bar iron is of a blueish white or grey colour, of a fibrous texture, and very brilliant in the fracture; it emits a peculiar odour when rubbed, and has a styptic taste. Its specific gravity varies from 7·6 to 7·8. It is attracted by the magnet, and becomes magnetic; properties which distinguish it from all other metals. It is very malleable, but less so than gold, silver, or copper; and is more ductile, tenacious, and elastic, than any other metal. Iron can be ignited by percussion, and melts at 158° of Wedgwood. Its surface is soon tarnished and oxidized when exposed to the air; and the oxidizement is much hastened by the presence of water, which it decomposes. Percussion at a high temperature separates from its surface oxidized scales; the sparks produced by its collision with flint are oxidized; and in the state of wire, when made red hot at one extremity, and introduced into a bottle of pure oxygen gas, it burns with great splendour, and is oxidized in globules. According to Proust, completely oxidized iron consists of 48 parts of oxygen and 52 of iron.

Iron is of all the metals the least injurious to the animal system, being in no respect poisonous. It was medicinally used by the ancients; for Dioscorides, we know, employed it quenched in wine as a remedy for dysentery; and its use was by no means unfrequent as an external application for the cure of malignant ulcers. The effects of iron, however, as an internal remedy, were very little understood until more modern times. It acts as a powerful tonic, increasing the general excitement, promoting the digestive powers and healthy secretions, giving a more florid hue to the blood, and augmenting in a great degree the energy of the muscular fibres. It answers the intentions for which it is prescribed more effectually, when it is given in small doses, minutely divided as it is found in chalybeate springs, and its use long continued. The diseases in which it is used are those which are dependent on, or attended with, a weak, languid, leucophlegmatic habit of body, as chlorosis, hysteria, dyspepsia, fluor albus, gleet, passive hæmorrhagies, palsy, scrofula, rickets, and the last stage of phthisical affections; it is also beneficial in convalescence from almost all acute diseases, and has been lately recommended as a specific in cancer. The use of iron is contra-indicated whenever the inflammatory diathesis prevails, or there is any particular fulness of the vessels; or an increased secretion of bile, particularly in sanguineous habits. In these states of the system it occasions heat, thirst, headach, laborious respiration, and many other unpleasant symptoms; but when given in a proper state of the body few medicines are capable of producing more beneficial effects.

For the purposes of medicine soft malleable iron undergoes various preparations (see *Preparations and Compositions*): but at present we have to notice it only as it is mentioned in the lists of materia medica of the British pharmacopœias.

1. METALLIC IRON.

Officinal. FERRI RAMENTA ET FILA. *Lond.* FILA ET LIMATURA. *Edin.* FERRI SCOBS. *Dub.* Iron filings and wire.

Syn. Limailles de Fer (*F.*) Gopulvertes Eissen, (*G.*) Limatura di Ferro, (*I.*) Limadura de hierro, (*S.*) Cerumboo podie, (*Tam.*)

These filings are obtained from the workers in iron; but as they are often mixed with copper filings and other impurities, it is necessary, in order to purify them, to draw them upwards through a sieve, or piece of coarse gauze, with a magnet.

Medical properties and uses.—Metallic iron exerts no action on the living system, unless it meets with acid in the stomach, in which case it becomes tonic. Iron filings, therefore, are not adapted for all the cases in which chalybeate remedies prove useful; and are chiefly suited to those cases of dyspepsia, hysteria, chlorosis, and general debility, which are accompanied with acidity in the first passages. When iron is oxidized by the assistance of watery fluids, hydrogen gas is evolved; hence, when the filings are rendered active in the stomach, fœtid eructations are produced, and the fæces are coloured black; which, therefore, are evident symptoms of the medicine having taken effect. As an anthelmintic iron filings may operate mechanically, and dislodge worms; but even in worm cases the oxidizement of it in the stomach renders it more useful.

Iron wire is used for pharmaceutical preparations, on account of the purity of the iron from which it is made; as the softest and purest iron only can be drawn.

The filings are given in the form of powder combined with some aromatic, or made into an electuary with honey, or in pills in combination with myrrh, ammoniacum, or some bitter extract. The dose may be from grs. v. to ʒſs.

Officinal preparations. *Ferri Limatura Purificata.* E. *Oxidum Ferri Nigrum purificatum.* E. D. *Ferri Acetas.* D. *Subcarbonas Ferri præparatus.* E. D. *Carbonas Ferri præcipitatus.* E. D. *Ferri Sulphas.* L. E. D. *Ferrum tartarizatum.* L. E. *Tinctura Acetatis Ferri.* D. *Liquor Ferri alkalini.* L. *Vinum Ferri.* L. D. *Murias Ammoniæ et Ferri.* E. *Sulphuretum Ferri.* E. *Rubrum Ferri Oxidum.* E.

2. OXIDIZED IRON.

Officinal. FERRUM; SQUAMÆ OXIDI. *Dub.* The Scales, of the Oxide of Iron.

Syn. Bluettes de Fer (*F.*) Eissenoxyd (*G.*) Scaglio di ferro (*I.*) Escamas de hierro (*S.*)

These scales are detached by the hammer of the smith from the surface of iron heated to redness in the forge, and hammered on the anvil.

Qualities. — They are inodorous and insipid, attracted by the magnet, brittle, and reducible by trituration to a powder which is of a black colour. This oxide is soluble in acids, without producing hydrogen gas; and appears to be the metal in the first degree of oxidizement, consisting, according to Lavoisier and Proust, of 27 parts of oxygen, and 73 of iron.

Medical properties and uses. — These scales are used in the same cases and in the same manner as the filings, and are preferable; for, as they do not produce hydrogen gas when dissolving in the stomach, their use is unaccompanied by the distension and flatulence which the filings often occasion.

FERULA. *Spec. Plant. Willd.* i. 1411.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbellatæ.

G. 539. *Fruit* oval, compressed, plane, three streaks on each side.

Species 11. F. *Assafœtida.*[1] Assafœtida. *Kæmpfer. Amœnitates Exoticæ,* 535. *t.* 536.

Officinal. ASSAFŒTIDÆ GUMMI-RESINA. *Lond. Edin.* ASSAFŒTIDA. *Dub.* Assafœtida.

Syn. Assafœtida (*F.*) Stinkender Asand (*G.*) Assafetida (*I.*) Asafetida (*S.*) Hiltect (*Arab.*) Hing (*H.*) Hinga (*San.*)

This species of ferula is a native of the south of Persia, chiefly growing on the mountains in the provinces of Chorasaan and Laar, where it is named *hingisch.* The root is perennial, tapering, and ponderous; when fully grown, the size of a man's leg, covered with a blackish coloured bark, and near the top beset with strong rigid fibres. The internal substance is fleshy, white, and abounds with a thick, very fetid milky juice. The stem is round, smooth, and striated; rising erect to the height of nine feet, and is about seven inches in circumference at the base; surrounded with six or seven radical leaves, nearly two feet long, bipinnate, with alternate pinnules, smooth, sinuated, lobed, or lanceolate; of a deep green colour, and fetid odour. The flowers are in plano-convex, terminal, compound umbels: the seeds oval, flat, foliaceous, of a reddish brown colour, rough, with three longitudinal lines; and have a porraceous odour, and a sharp bitter taste.

When the root is four years old it is fit to yield the assafœtida, which is procured in the following manner. At the season when the stem and leaves begin to decay, they are twisted off from the root, which is then exposed by digging away the earth that surrounds it. It is left in this state screened from the sun for forty days; then the top is cut off transversely; and after forty-eight hours the juice which has exuded is scraped off, and another transverse section is made. This operation is repeated three successive times, and then the root is allowed to remain untouched for eight or ten days, before another section is made. The root perishes after it is exhausted of the juice. The juice collected from a number of roots is put together and dried in the sun.

Assafœtida is brought to this country packed in cases, mats, and casks; that in the cases proving generally the best. It is in irregular masses, adhering to each other, externally of a brownish yellow colour, and containing many little shining tears of a whitish, reddish, or violet hue. The best is clear, and of a pale reddish colour, contains many of the white tears, and has the odour very strong.

Qualities. — Assafœtida has a strong, very disagreeable, alliaceous, fetid odour, and a bitter subacrid taste: but these qualities, particularly the odour, on which much of the efficacy of the drug depends, are much injured by keeping.[1] It becomes brittle by exposure to the air; but is not easily reduced to powder. It yields all its virtues to ether and to alcohol. It is diffused by trituration in water, forming a milky opaque mixture. The ethereal tincture, when evaporated on water, leaves a thick pellicle of brown fetid resin, and gives the water a milky appearance. In distillation either with water or alcohol assafœtida yields an essential oil, on which its odour depends. The proportions of its components are gum 60, resin 30, and essential oil 10 parts in 100; but Brugnatelli affirms that the part which has been regarded as gum is extractive.[2]

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[1] The plant described and figured by Dr. Hope of Edinburgh, in the 75th volume of the *Philosophical Transactions*, as that which yields the officinal assafœtida, is the Ferula *Persica* of Willdenow, and a native of the north of Persia.

Medical properties and uses. — This gum resin is stimulant, antispasmodic, expectorant, emmenagogue, and anthelmintic. It is more efficacious than any of the other fetid gums; producing its effects in a shorter space of time; and is therefore beneficially given as an antispasmodic in cases of hysteria, hypochondriasis, dyspepsia, flatulent colic, tympanitis, and in nervous diseases: its expectorant powers have been found useful in asthma, and hooping-cough; and it ranks high as a remedy in chlorotic affections. We are informed that in India it is a successful native specific against the Guinea[3] worm. Its use is contra-indicated when the inflammatory diathesis is present; and owing to its stimulant quality, it is often combined with antimonials and nitre. It is used locally, in the form of enema in worm cases, flatulent colic, and in the convulsions attending dentition: and sometimes it is applied as a plaster for discussing tumours.

The dose is from grs. v. to ℈j, formed into pills, or diffused in water.

Officinal preparations. *Mistura Assafœtidæ.* L. D. *Tinct. Assafœtidæ.* L. E. D. *Spiritus Ammoniæ fœtidus.* L. D. *Pilulæ Assafœtidæ compositæ.* E. *Pilulæ Aloes et Assafœtidæ.* E.

FICUS. *Spec. Plant. Willd.* iv. 1131.

Cl. 23. *Ord.* 2. Polygamia Diœcia. *Nat. Ord.* Scabridæ *Linn.* Urticæ *Juss.*

1931. *Common receptacle* turbinate, fleshy, converging, concealing the florets, either in the same or a distinct individual.

Male. Calyx three-parted. *Corolla* 0. *Stamens* three.

Female. Calyx five-parted. *Corolla* 0. *Pistil* one. *Seeds* covered by a permanent, closed, somewhat fleshy calyx.

* *Leaves lobed.*

Species 1. F. *Carica.*[4] The Fig-tree. *Med. Bot. 2d. ed.* 714. *t.* 244.

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[1] Kœmpfer says: "Affirmare ausim drachmam unam, recens effusam, majorem spargere fœtorem quam centum libras vetustioris, quem siccum venundant aromatarii nostrates." *Amœn. Exoticæ,* p. 535.

[2] *Compendio di, Mat. Med.* p. 41. Pavia, 1817.

[3] *Edin. Med. Journ.* ii. 304.

[4] Συκη Græcorum.

Officinal. CARICÆ FRUCTUS. *Lond. Dub.* FICI CARICÆ FRUCTUS. *Edin.* The preserved fruit of the Fig.

Syn. Figues (*F.*) Feigen (*G.*) Fico (*I.*) Higo (*S.*)

The fig tree is a native of Asia, but it was introduced into Europe in the early ages. It flourishes in France, Spain, and Italy, and even sometimes ripens its fruit in [1] England. It flowers in June and July. It seldom rises above twelve feet in height, but sends off many spreading branches; and the trunk, which exudes a milky odorous fluid when wounded, is covered with an ash-coloured bark, and seldom exceeds seven inches in diameter. The leaves, which are annual in Europe, but perennial between the tropics, are large, nearly a span in length, scabrous, and irregularly divided into three or five lobes; of a deep green colour on the upper surface, with a pale green longitudinal vein to each lobe; but on the under surface the whole is pale green, with the veins raised, reticulated, and downy: they are supported on round petioles. The fruit in its early stage serves as a common receptacle, and contains upon its inner surface both the male and female florets. It is turbinate, umbilicate at the top, in colour varied green and red, fleshy, soft, and hollow within. [2]

The fig tree was very much cultivated by the ancients, who brought the fruit to perfection by a process which they termed caprification. They had observed that those figs which were perforated by an insect, the Cynips Psenes of Linnæus, always ripened better; and, therefore, they tied a wild fig, on which this insect breeds, near the young figs, so as to cause the insects, when they issued from the wild fig, also to perforate them. The good effects arose from the crawling of the larvæ within the figs scattering the pollen, and thus forwarding the impregnation of the female florets: but the gardeners of Aleppo, ignorant of the cause of the benefit derived from the cynips, imitate the process by pricking the figs with a needle dipped in oil, in order to procure early figs. The fruit when ripe is dried in ovens to preserve it, and destroy any of the larvæ of the cynips that may remain; and then packed very closely into the small chests in which they are imported into this country.

Qualities.—Dried figs have a sweet peculiar taste. They are generally compressed; the cuticle is of a brownish colour, and crusted over with crystals of sugar; and within are numerous small yellow lenticular seeds in a sweet viscid pulp. They consist almost entirely of mucilage and sugar.

Medical properties and uses.—The dietetical use of figs is well known.[1] When eaten freely they are apt to occasion flatulent colic and diarrhœa. They are used medicinally in demulcent decoctions, in pulmonary and other inflammatory complaints; and two ounces of them boiled in six fluid ounces of water, and strained, form a useful gargle in cynanche tonsillaris, when suppuration takes place. The figs themselves, roasted or boiled and split, form excellent cataplasms, when applied very hot to gum boils, buboes, and other phlegmons.[2]

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[1] The first fig-trees introduced into England are still in the Archbishop's garden at Lambeth. They are supposed to have been planted by Cardinal Pole, and now bear excellent fruit.

[2] *Gærtner de Fructibus*, ii. 66. *t.* 91.

FRAXINUS. *Spec. Plant. Willd.* iv. 1102.

Cl. 23. *Ord.* 2. Polygamia Diœcia. *Nat. ord.* Sepiariæ *Linn.* Jasmineæ *Juss.*

G. 1903. Hermaph. *Calyx* 0, or four-parted. *Corolla* 0, or four-parted. *Stamens* two. *Pistil* one. *Capsule* one-seeded, lanceolate. Female. *Pistil* one, lanceolate.

Sp. 15. F. *Ornus.*[3] Flowering ash. *Med. Bot. 2d edit. p.* 589. *Sibthorp Flora Græca, t.* 4.

Officinal. MANNA. *Lond. Dub. Edin.* Manna.

Syn. Manne (*F.*) Manna (*G.*) Manna (*I.*) Mana (*S.*) Turenjeebeen (*Arab.*) Shirkhisht (*H.*)

This tree is a native of the south of Europe, growing abundantly in Calabria, Apulia, Sicily, and on the loftier mountains of Greece; and is cultivated in England as an ornamental tree, flowering in May and June. It seldom exceeds twenty feet in height, is very branching, and has a smooth gray bark. The leaves are deciduous, petiolate, opposite, and pinnate, composed of two or three pair of leaflets, with a terminal one: the leaflets are opposite, about one inch and a half long, and three-fourths broad, pointed at each end, obtusely and unequally serrated, smooth, and of a deep bright green colour. The footstalks vary in length, and are channelled; the gems are villous. The flowers, which grow in close panicles at the extremities of the young shoots, are supradecompound, opposite, scarcely the length of the leaves, smooth, and without bractes. The segments of the calyx are ovate, pointed, and nearly equal; the petals oblong and linear, obtuse, entire, attenuated at the base, spreading, twice the length of the calyx, and of a white colour. The filaments are two, spreading, white, smooth, and bearing yellow incumbent anthers. The germen is small, oval, and smooth, with a short, straight style crowned with a notched stigma. The capsules droop, are lanceolate, notched, compressed, and bilocular at the base; with one cell generally abortive, while the other contains a cylindrical ferruginous seed.

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[1] Figs were the chief part of the food of the ancient Athletæ.

[2] The most ancient cataplasm on record was made of figs. It was used for the relief of Hezekiah, who lived 260 years before Hippocrates. "And Isaiah said, Take a lump of figs. 'And they took and laid it on the boil, and he recovered." 2 Kings, chap. xx. 7.

[3] *Μελια* Dioscoridis.

Two other species of ash, the *rotundifòlia* and *excelsior*, also produce manna. It exudes in warm dry weather spontaneously from the stem and branches; and concretes into whitish tears, which are scraped off and sold under the name of manna in the tear. The greater part of the manna, however, is obtained by longitudinal incisions about three inches in length, made on one side of the tree only in the same season, and continued from the base of the trunk, upwards as far as the branches, at the distance of an inch from each other. The manna flows at first in form of a thick juice, which gradually concretes. It is collected in baskets, and known under the name of *manna grassa*, fat manna: and is in irregular masses of a reddish or brownish colour, often full of impurities. By making the juice to concrete on straws, and chips fastened near the incisions, a finer kind of manna is procured, which is called canulated or flaky manna, *manna in cannoli*. The collecting begins about the middle of June, and terminates in September.[1]

Manna is brought to Great Britain packed in chests. The different sorts are in separate packages, and are known by the names of Flake manna, Sicilian manna, and Calabrian manna. The best is "in oblong pieces or flakes, moderately dry, friable, light, of a whitish or pale yellow colour, and in some degree transparent: the inferior kinds are moist, unctuous, and brown."[2] Manna is said to be occasionally counterfeited by a composition of honey or sugar, mixed with scammony or some other purgative[3]: but such frauds are now seldom attempted; and bad or counterfeit manna may be easily discovered by its colour, weight, transparency, and taste; which are different from those of real manna.

Qualities.—Manna has a slight peculiar odour, and a sweet taste, with some degree of bitterness, not very pleasant, and leaving a nauseous impression on the tongue. The finer pieces, which are often hollow, when broken and examined by the microscope, exhibit bundles of long beautiful spicular crystals: but the general texture of the pieces is granular. It is entirely soluble in water and alcohol; and the latter, when the solution has been assisted by heat, deposits on cooling five-eighths of the manna beautifully crystallized; and which may be regarded as pure manna, and an uncrystallizable mucilaginous extractive matter remains, on which probably the purgative quality of the drug depends. Fourcroy and Vauquelin suppose that the common manna of the shops contains four different ingredients. 1. Pure manna, constituting three-fourths of the whole. 2. A little common sugar. 3. A yellow nauseous-smelling substance, to which its purgative qualities seem owing: and 4. Mucilage.

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[1] Arctuarius is the first Greek who notices manna. *Freind's Hist. of Med.* i. 271.

[2] *Lewis.*

[3] *Alston's Mat. Med.* ii. 472.

Medical properties and uses.—Manna is a very gentle laxative. It was extravagantly commended by some of the older physicians; but is now more justly regarded as a laxative fit for children only, and persons of very weak habits. When given in a dose sufficient for an adult, it is apt to occasion flatulence and griping; and therefore it is seldom used, except as an adjunct to senna, rhubarb, or solutions of neutral salts, with the view of covering their tastes.

The dose for children is from ʒij to ʒiv; and for adults from ℥j to ℥ij.

FUCUS. *Genera Plant. Schreber.*

Cl. 24. *Ord.* 3. Cryptogamia Algæ. *Nat. ord.* Algæ.
G. 1671. *Male. Vesicles* smooth, hollow, with villose hairs within, interwoven.
Female. Vesicles smooth, filled with jelly, sprinkled with immersed grains, prominent at the tip. *Seeds* solitary.
Species 2. F. *vesiculosus.* Bladder-wrack. *Turner's Fuci,* ii. 44. *Eng. Bot.* 1066.
Officinal. FUCUS. *Lond.* QUERCUS MARINA; HERBA FRUCTIBUS PRÆSENTIBUS. *Dub.* Bladder-wrack, bearing the fruit.

This marine plant is a perennial, a native of the British shores; bearing the fructification in the spring. The root is an expanded, black, woody, callous disk. The frond is smooth and glossy, from one to four feet in length, and from half an inch to one inch and a half in breadth, of a dark olive green colour, becoming paler near the apices; every where linear, and dichotomous; and through its whole length furnished with a midrib of a blackish colour, as thick as a goose quill at the base, but gradually growing pale and thin. In the membranous part are found immersed spherical vesicles, varying in size from a pea to a hazel nut, always close to the midrib, their substance thin, and their cavity full of air. The fructification consists of compressed turgid solitary or twin receptacles at the ends of the branches; roundish, perforated, and filled with a tasteless pellucid mucus.

When the plant is dried it becomes brittle, and of a dull black colour; and sometimes is covered with a saline efflorescence. It is much used in the making of kelp.

Qualities. — The odour is slight, but peculiar; and the taste nauseous, and similar to that of soda. When burnt, it yields charcoal and soda.

Medical properties and uses. — The burnt plant is considered as deobstruent; and has been exhibited in scrophulous affections and bronchocele: and Dr. Russel found the mucus of the vesicles an excellent resolvent when externally applied to scrophulous swelliugs.

Officinal preparation. *Pulvis Quercus marinæ.* D.

GALBANI GUMMI RESINA. Vide *Bubon.*

GALLÆ. Vide *Quercus.*

GENTIANA.[1] *Spec. Plant. Willd.* i. 1331.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Rotaceæ *Linn.* Gentianæ *Juss.*

G. 512. *Corolla* one-petalled. *Capsule* two-valved, one-celled; with two longitudinal receptacles.

* *Corollas 5 or 9-cleft, somewhat bell shaped.*

Species 1. G. *lutea.* Yellow Gentian. *Med. Bot. 2d edit.* 273. *t.* 95.

Officinal. GENTIANÆ RADIX. *Lond.* GENTIANÆ LUTEÆ RADIX. *Edin.* GENTIANA; RADIX. *Dub.* Gentian Root.

Syn. Gentiane jaune (*F.*) Enzian (*G.*) Genziana (*I.*) Genciana (*S.*)

This species of gentian is a perennial plant, found growing on the alps of Switzerland and Austria, the Apennines, the Pyrennees, and in North America. The root is thick, long, and cylindrical. The lower leaves are petioled, large, spear-shaped, stiff, and having five large veins on the back, plaited, and of a yellowish green colour; those of the stem are concave, smooth, and egg-shaped, sessile, and almost embracing the stem, which rises three or four feet in height. The flowers are in whorls at the upper joints, large, yellow, peduncled, and beautiful: the calyx, which is a membranous deciduous spathe, bursts on the side when the flower opens: the corolla is rotated, divided into five or eight narrow spreading segments, elliptical, and speckled with many thick dots. The filaments are shorter than the corolla, and furnished with long erect anthers: the germen is conical, crowned with two sessile reflected stigmas; and becomes a conical capsule, which contains numerous small seeds.

Gentian roots are brought to this country from Germany. They are in pieces of various lengths and thickness, twisted, wrinkled on the outside, and covered with a brownish gray cuticle.

Qualities. — They have no particular odour, and the taste is intensely bitter without being nauseous. When cut transversely the pieces exhibit a yellow maculated heart, with thick bark verging to brown. The sensible qualities of gentian root are extracted by ether, alcohol, and water. The two former extract a bitter resin and an extractive matter; and the latter some part of these and a considerable quantity of mucilage also, which occasions the infusion often to become ropy. Diluted alcohol is its proper menstruum. In the bitter resin which is deposited from the ethereal tincture, opaque, and of a pale yellow colour, the virtues of the drug seem to reside.

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[1] Said to have been named after Gentius, king of Illyria, who first discovered its medicinal properties 167 years before the birth of our Saviour.

Medical properties and uses. — Gentian root is tonic, stomachic, and in large doses aperient. Its use as a stomachic bitter is of very ancient date; and it is still, perhaps, the most generally employed of this class of medicines. It has been found beneficial in dyspepsia, gout, hysteria, and jaundice; chlorosis, dropsy, and diarrhœa; and in all cases of general debility in which tonics are indicated. It is sometimes joined with the cinchona in intermittents; and, according as the circumstances of the cases for which it is prescribed direct, it may be combined with orange-peel, chalybeates, aromatics, squill, mineral acids, and neutral salts. On account of its antiseptic effects on dead animal matter, its infusion has been used as an application to putrid ulcers. The forms in which it is generally given are infusion and tincture.

The dose in substance is from grs. x. to ℈ij.

Officinal preparations. *Extractum Gentianæ.* L. E. D. *Infusum Gentianæ compositum.* L. E. D. *Tinctura Gentianæ composita.* L. E. D. *Vinum Gentianæ compositum.* E.

GEOFFROYA. *Spec. Plant. Willd.* iii. 1129.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. ord.* Papilionaceæ *Linn.* Leguminosæ *Juss.*

G. 1362. *Calyx* five-parted. *Drupe* ovate. *Nucleus* compressed.

Species 3. G. *inermis.* The Cabbage-tree. *Med. Bot. 2d edit.* 416. *t.* 151. *Phil. Trans.* lxvii. 512. *t.* 10.

Officinal. GEOFFROYÆ INERMIS CORTEX. *Edin.* GEOFFRŒA; CORTEX. *Dub.* Cabbage-tree bark.

Syn. Umari de la Jamaique (*F.*) Geoffrunrinde (*G.*) Geoffrea (*I.*)

This tree is a native of Jamaica, growing in the low savannahs. It is a lofty tree, branching towards the top; and covered with a smooth gray bark. The leaves are pinnate, composed of four or five pairs of lancet-shaped, pointed, smooth, leaflets, in pairs on short footstalks, with a terminal one. The flowers are in clusters on large branched spikes. The calyx is bell-shaped, with five short obtuse teeth; the corolla papilionaceous, of a pale rose colour, consisting of a roundish concave *vexillum* notched at the apex; two oblong, obtuse, concave, somewhat shorter *alæ;* and an obtuse divided *carina.* The filaments, nine of which are united at the base, support simple, roundish anthers; the germen is oval, with a curved tapering style, and hooked stigma. The fruit resembles a small plum, is pulpy, marked on each side with a longitudinal furrow; and contains a hard seed.

Qualities. — Cabbage-tree bark has a disagreeable, sweetish, mucilaginous taste. The pieces, as they are brought to this country, are externally gray; internally black, furrowed, and pulverulent, affording a powder resembling that of jalap. Its soluble components seem to be chiefly mucus, resin, extractive, a saccharine matter, and the narcotic principle.

Medical properties and uses. — This bark is a powerful anthelmintic. Its properties as such were first noticed by Mr. Peter Duguid[1], and have since been fully confirmed: but we are principally indebted to Dr. Wright for an accurate knowledge both of the plant and its virtues.[2] It is particularly useful in expelling lumbrici; and may be given in the forms of powder, decoction, extract, and syrup; but the decoction is the form most commonly employed. (See *Preparations and Compositions.*) It operates as a cathartic; but has a narcotic effect also: and requires therefore to be given at first in small doses, "which may be gradually increased till a nausea is excited, when the dose for that patient is ascertained."[3] In overdoses it is apt to occasion sickness, vomiting, fever, and delirium; and the same effects are produced if cold water be drunk during its operation. When such symptoms occur from either cause, they are generally removed by copious draughts of warm water, a dose of castor-oil, and plentiful dilution with lemonade or infusion of tamarinds. Owing to these deleterious effects of the remedy, it has not been generally used in this country.

The dose of the powder is from ℈j to ʒſs; — and that of the extract, which is made by evaporating the decoction, grs. iij. The syrup, which is the decoction with a double portion of sugar added to it, may be taken in doses of from 2 to 4 spoonsful.

Officinal preparation. *Decoctum Geoffroyæ inermis.* E.

GEUM. *Spec. Plant. Willd.* ii. 1113.

Cl. 12. *Ord.* 8. Icosandria Polygynia. *Nat. ord.* Senticosæ *Linn.* Rosaceæ *Juss.*

G. 1002. *Calyx* ten-cleft. *Petals* five. *Seeds* with a bent awn.

Species 3. G. *urbanum.*[4] Common Avens, or Herb Bennet. *Med. Bot.* 2*d edit.* 502. *t.* 181. *Smith Flora Brit.* 554.

Officinal. GEUM URBANUM; RADIX. *Dub.* The root of Avens.

Syn. Bonoite officinale (*F.*) Nelkenwurzel (*G.*) Cariofilata (*I.*)

Avens is an indigenous perennial plant, common in woods and shady places, flowering from May to August. The root is fibrous; the stem about two feet high, nearly upright, roundish, hairy, leafy, branched at the top, and of a brownish hue on one side. The leaves are of a deep green colour, on channelled footstalks; those nearest the root pinnated and lyrate, with two pairs of unequal leaflets, and a larger wedge-shaped terminal one; the upper leaves are simple, trifid, and

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[1] *Physical and Literary Essays*, ii. 264.

[2] *Phil. Trans.* l. c.

[3] *Wright*, l. c.

[4] Caryophyllata, *Alston's Mat. Med.* vol. i. p. 402.

pointed; and all cleft, serrated, and hairy. The stem-leaves are accompanied with a pair of large, rounded, lobed, toothed stipules resembling the smaller leaflets. The flowers are terminal and solitary, on peduncles. The calyx is externally brownish, internally pale green, of one piece, divided into five large pointed segments, and five intermediate ones much smaller, and lanceolate. The petals are bright yellow, small, with claws, and spreading: the filaments awl-shaped, nearly as long as the larger segments of the calyx, yellowish, inserted into the calyx; at first bent inwards, afterwards erect, and supporting yellow anthers. The germens are hairy, collected into a pear-shape, the styles jointed in the middle, with simple stigmas. The seeds are hairy, with purple naked awns, hooked, and kneed near the apex.

The root should be dug up in March; for the odour, which is then strong, is almost lost when the flowers appear. It should be dried in the air, with a moderate heat. The large roots are to be preferred. The cultivated are supposed to be superior to the wild.

Qualities.—Avens root has a fragrant odour resembling that of cloves, and a bitterish austere taste. The pieces are of a dark brownish red colour on the outside, and internally white. Its sensible qualities are extracted both by water and alcohol; and in distillation with water it yields a small portion of heavy volatile oil. The watery infusion reddens litmus paper, and strikes a black colour with sulphate of iron.

Medical properties and uses.—The root of avens is astringent, tonic, and antiseptic. It is mentioned by Ray as a febrifuge, but has been very little used in Britain, and was altogether unnoticed, until Buckhave, in a work entitled *Observationes circa Radicem Gei urbani*, adduced numerous instances of its efficacy in intermittents. The continental practitioners recommend it in dysentery, chronic diarrhœa, and flatulent colic; and as a general tonic in all cases in which cinchona is commonly employed. The Dublin College has therefore judiciously inserted it in the list of materia medica; and, being an indigenous remedy, it deserves attention.[1] It may be exhibited in the form of powder; or in an electuary compounded with honey and rhubarb; or a decoction may be made with one ounce of the root and one pint of water; or a tincture with similar proportions of the root and alcohol. The dose of the powder is ʒſs or ʒj, four times a day; of the decoction f℥j every hour; and of the tincture fʒſs properly diluted three or four times a day.

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[1] Augsburg beer, which is much prized on the continent, is supposed to owe part of its excellence to the custom which prevails of putting a small bag of the root of Avens into each cask. *Nicholson's Journ.* vol. xxx. p. 80.

GLYCYRRHIZA.[1] *Spec. Plant. Willd.* iii. 1143.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. ord.* Papilionaceæ *Linn.* Leguminosæ *Juss.*

G. 1366. *Calyx* bilabiate; upper lip three-cleft, lower undivided. *Legume* ovate, compressed.

Sp. 4. G. *glabra.* Common Liquorice. *Med. Bot. 2d ed.* 420. *t.* 152.

Officinal. GLYCYRRHIZÆ RADIX. *Lond. Dub.* GLYCYRRHIZÆ GLABRÆ RADIX:—EXTRACTUM. *Edin.* Liquorice root, and the extract.

Syn. Réglisse (*F.*) Sussholzwurzel (*G.*) Legorizia (*I.*) Regaliza (*S.*) Ussulussoos (*Arab.*) Ié'nimad'h (*H*) Yastimadhuca (*San.*)

The liquorice plant is a native of the south of Europe and Syria; but the greater part of what is used in Britain is the produce of its own soil by cultivation. The London market is supplied chiefly from Mitcham in Surry.[2] It flowers in August. The root is perennial, running when in its proper soil, a light sandy one, very deep; it is round, the thickness from that of a goose-quill to that of the thumb, long, thin, flexible, furnished with sparse fibres; covered with a brownish cuticle, internally fibrous, of a pale yellow colour, and juicy. The stem rises four or five feet in height, is herbaceous, and striated, with few branches. The leaves are alternate, and pinnated; consisting of four or five pairs of ovate, retuse, petiolated leaflets, with a terminal one; of a pale green colour, and clammy on the under side. The flowers are papilionaceous in long axillary sparse spikes, of a blue or purplish colour. The calyx is persistent, tubular, and divided above; the corolla consists of an ovate, lanceolate, obtuse, erect, concave *vexillum*; two oblong obtuse *alæ*, and a shorter *carina*. The filaments are ten, nine of them united at the base, bearing simple roundish anthers; the germen is short, with a tapering style and blunt stigma. The legumes are ovate, flatted, smooth, acute, one-celled, containing two or three small kidney-shaped seeds.

When liquorice root is three years old, it is dug up for use in November. "The whole roots are then washed, the fibres cut off, and the smaller roots separated from the larger ones. The former, termed the offal, are dried, and ground to powder; the latter are packed up, and sold to the druggists."[3]

Qualities.—This root is inodorous, and the taste sweet and mucilaginous, leaving, when it is chewed without being peeled, a slight degree of bitterness in the mouth. The powder, if good, is of a brownish yellow colour, and has a rich sweet taste, more agreeable than that of the fresh root; but it is said to be often sophisticated with flour, and other substances not quite so wholesome, in which case it has a fine pale yellow colour.

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[1] The name is derived from γλυκυς sweet, and ῥιζα a root.

[2] Very little is now grown at Godalming, where it was formerly cultivated to some extent. Vide *Stevenson's Survey of Surry, p.* 380. It was first cultivated in England, in 1558. *Stow.*

[3] The price of the best roots is about 3*l.* per cwt. *Stevenson,* l. c.

The medical properties of the root depend on a saccharine matter and mucus: water, by coction, extracts both of these principles; but alcohol only the saccharine matter. For the properties of the extract which is imported from Spain, see Part III. (*Preparations and compounds.*)

Medical properties and uses.—Liquorice root is a pleasant demulcent; but on account of its bulk it is rarely used in substance.[1] The decoction of it, either alone, or in combination with other mucilaginous vegetables, is often given in catarrh, and in hectic and phthisical cases. It is also administered in some cases of dyspepsia where there is a deficiency of the natural mucus of the stomach, which is injured by the acrimony of ill-digested food, and a morbid state of its secreted fluids. The dose of the powder is from grs. x to ʒj, that of the decoction a cupful frequently repeated.

Officinal preparation. *Extractum Glycyrrhizæ.* L. E. D.

GRANATI CORTEX. Vide *Punica.*

GRATIOLA.[2] *Spec. Plant. Willd.* i. 102.

Cl. 2. *Ord.* 1. Diandria Monogynia. *Nat. ord.* Personatæ *Linn. Juss.*

G. 49. *Corolla* irregular, reversed. *Stamens* two, sterile. *Capsule* two-celled. *Calyx* seven-leaved; the two exterior leaves spreading.

Species 1. G. *officinalis.* Hedge-Hyssop. *Med. Bot. 2d edit.* 359. *t.* 131. *Flora Danica, t.* 363.

Officinal. GRATIOLÆ OFFICINALIS HERBA. *Edin.* GRATIOLA; HERBA. *Dub.* The herbaceous part of Hedge-Hyssop.

Syn. Gratiole (*F.*) Gradenkraut (*G.*) Graziola (*I.*)

This plant is a perennial, a native of the South of Europe, growing in marshy or moist pastures, and flowering in June and July. It is cultivated in Britain.[3] The root is creeping, cylindrical, fleshy, and fibrous; and sends up several upright, smooth, round stems, nearly a foot in height, with sessile leaves, in some degree sheathing, and opposite, in pairs. They are lanceolate, smooth, serrated towards the point, of a bright green colour, nearly two inches long, and half an inch broad, punctured and longitudinally veined beneath. The flowers are axillary and solitary, on slender red peduncles: the calyx is divided into five elliptical segments, with two lanceolate spreading bracteal leaves; the corolla is tubular, divided at the lip into four obtuse segments, the uppermost of which is much broader than the other three, and more reflected; the tube is yellow, intermixed with reddish streaks; the limb pale purple.

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[1] The ancients believed that chewing the root allayed thirst; but this opinion was founded on a mistake. *Cullen, Mat. Med.* ii. p. 407.

[2] The name means *Gratia Dei*—from the supposed virtues of the plant.

[3] It was first cultivated in Britain by Turner, in 1568.

Two of the filaments only are furnished with anthers; and the style is tapering, erect, with a divided stigma. The capsule is oval, and contains many small seeds.

The sensible qualities of gratiola are strongest when it is in flower, at which time, therefore, it should be gathered for use.

Qualities.—It has scarcely any odour; but the taste is very bitter and nauseous. Boiling water extracts its sensible qualities more perfectly than alcohol. The colour of the infusion approaches to that of Madeira wine; it slightly reddens litmus paper, and strikes an olive colour with a solution of sulphate of iron without occasioning a precipitate. When sulphuric acid is added to the unstrained infusion, it emits the odour of tamarinds; and when the infusion is filtered and slowly evaporated, spicular crystals are formed, which appear to be tartaric acid.

Medical properties and uses.—Gratiola is cathartic, and diuretic; and in large doses emetic. It has been much recommended by the German physicians in dropsy; and has also been used in jaundice, and worm cases. Hufeland found it extremely efficacious in visceral obstructions, and scrophulous affections[1]: and we are even told that in the Vienna hospital it has cured the most confirmed cases of lues venerea ![2]

It is given either in the form of powder, or of infusion combined with aromatics. The dose of the powder is grs. xv. to ʒſs; that of the infusion, made with ʒij of the dried herb and Oſs of warm water, from fʒiv to f℥j, three times a day.

GUAIACUM.[3] *Spec. Plant. Willd.* ii. 538.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Gruinales *Linn.* Rotaceæ *Juss.*

G. 819. *Calyx* five-parted, unequal. *Petals* five, inserted into the calyx. *Capsule* angular, three or five-celled.

Species 2. G. *officinale.* Officinal Guaiacum. *Med. Bot. 2d edit.* 557. *t.* 200.

Officinal. GUAIACI RESINA ET LIGNUM. *Lond.* GUAIACI OFFICINALIS LIGNUM-RESINA. *Edin.* GUAIACUM; LIGNUM, GUMMI-RESINA. *Dub.* The wood and Resin of Guaiacum.

Syn. Guyac (*F.*) Guajakgummi (*G.*) Guajaco (*I.*) Guayaco (*S.*)

This tree is a native of Jamaica, Hispaniola, and the warmer parts of America.[4] It rises forty feet in height, and is four or five in circumference, with many divided knotted branches. The bark of the trunk is of a dark gray colour, variegated with greenish or purplish specks, but that of the branches is ash-coloured, with fissures. The leaves are abruptly pinnate, consisting of two or three pair of smooth, shining, veined, obovate, dark green leaflets, almost sessile. The flowers are peduncled in kind of umbels, which spring from the divisions of the smaller branches. The calyx consists of five, concave, oblong, blunt, spreading, unequal, deciduous leaves; the petals are five, of a rich blue colour, elliptical, concave and spreading; the stamens are erect and villous, with yellowish hooked anthers; the germen is oval, with a short style and simple stigma; and the capsule subturbinate, on a short pedicel, smooth, and of a pale ferruginous hue, pentagonous, with ribbed angles, and 5-celled; but 2 or 3 often abortive.[1] The seeds are solitary, and angled.

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[1] *Hufeland uber die Natur, &c. der Scrofula.* [2] *Kostrewski, Dissert. de Gratiola,* p.64.

[3] The Spanish name *Guayaco*, comes from the Indian *Hoaxucan. Miller's Dict.*

[4] The tree was cultivated in this country by the Duchess of Beaufort in 1699.

All the parts of this tree possess medicinal qualities; but the wood and the peculiar substance afforded by it are the only parts used: and the virtues of the wood depend altogether on the peculiar matter it contains. This is spontaneously exuded from the tree, and is called native gum: it concretes into tears, which are semipellucid and very pure; but the greater part of it is obtained by making incisions into the trunk, or, as it is termed, jagging the tree. This operation is performed in May; and the juice, which flows copiously, is concreted by the sun. It is also obtained by sawing the wood into billets, and boring a hole longitudinally through them; so that, when one end of a billet is laid on a fire, the guaiac melting, runs through the hole from the opposite end, and is collected in a calabash. Boiling the chips or raspings in salt and water, also separates the guaiac, which as it rises to the surface may be collected by skimming.

The wood is brought to this country either in large solid pieces which weigh from four to five cwt. each, and covered with a yellowish alburnum, or already rasped. The guaiac, or gum as it is improperly termed, arrives in casks and mats; the former containing from one to four cwt. the latter generally less than one cwt each.

Qualities.— The *wood* of guaiacum is inodorous, but when heated it emits an aromatic odour; and the taste is bitterish, subacrid, and biting. It is very hard, heavier than water, externally yellowish, and internally of a blackish brown colour mixed with green streaks. The *resin*, or *guaiac*, has a fragrant odour, with scarcely any taste, but occasions when swallowed a sensation of heat in the throat. It has a resinous aspect; is of a greenish brown colour externally, and internally presents a mixture of greenish, reddish, and brownish tints. It is somewhat translucent, breaks with a vitreous fracture, and is easily reduced to a powder, which is gray at first, but becomes green in a short time when it is exposed to the air and light; a change which appears to depend on the absorption of oxygen:[2] The specific gravity of guaiac is 1·2289. It was generally regarded as a gum resin, till Mr. Brande's experiments showed it to be a substance sui generis, differing from both gum and resin.

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[1] *Gært. de Fructibus*, ii. 148. t. 113. fig. 1.

[2] This effect of light and air was first noticed by Doctor Wollaston, who found that the most refrangible produced this change; and subsequent experiments of Mr. Brande

When guaiac is digested in water a little extractive only is dissolved, in the proportion of 9 parts in 100, and the infusion has a greenish brown colour and a sweetish taste. Alcohol dissolves readily 95 parts in 100, and the solution is decomposed by the mineral acids, affording precipitates which assume various tints of colour (see *Tinctura Guaiaci*). Sulphuric ether dissolves four parts in ten of guaiac, and when evaporated on water leaves a tough, pellucid pale brown pellicle, which appears to be pure guaiac: it becomes green after some time; and a small portion of extractive remains dissolved in the water. The alkaline solutions and their carbonates dissolve it readily; and the solutions are precipitated by the diluted sulphuric, the nitric, and the muriatic acids. Sulphuric acid dissolves it with scarcely any effervescence, affording a solution of a rich claret colour, which, when fresh prepared, deposits a lilac-coloured precipitate on the addition of water; and when heated separates some charcoal. Nitric acid dissolves it with a strong effervescence and a copious extrication of nitrous fumes; and when the solution is evaporated, it yields a large portion of oxalic acid: by the diluted acid it is converted into a brown resinous substance. Muriatic acid dissolves a small portion only, and affords a solution of a brown colour. I found that, during the solution of guaiac in these acids, the heat which was evolved raised the thermometer in the following proportions: in the sulphuric 44; in the nitric 120; and in the muriatic 8 degrees. Nothing comes from the distillation of guaiac in water; but Mr. Brande obtained from 100 parts of it distilled in close vessels the following products: acidulous water 5·5, thick brown oil 24·5, thin empyreumatic oil 30·0, charcoal remaining in the retort 30·5, and 9·5 of gasses, which were chiefly carbonic acid and carburetted hydrogen.[1] From these experiments it is clear that guaiac differs from resin; and we also learn that the mineral acids are incompatible in prescriptions with it.

It is sometimes adulterated with common resin and Manchinal gum. The former is detected by the turpentine emitted when the suspected guaiac is thrown on hot coals; and the latter by adding to the alcoholic solution a few drops of sweet spirit of nitre, and diluting with water; the guaiac is precipitated, but the adulteration floats in white striæ.

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clearly proved it to arise from oxygen. I found that the change takes place in an hour, when the powder is exposed to sunshine. It appears to be again deoxidized if exposed to the least refrangible rays only, according to Dr. Wollaston's experiments.

[1] *Philosophical Trans.* 1806: and *Phil. Mag.* xxv. 107.

Medical properties and uses. — Both the wood and the guaiac are stimulant, diaphoretic, diuretic, and purgative. The wood was introduced into Europe by the Spaniards as a remedy for lues venerea in 1508, but it had long before been used for the same purpose by the natives of St. Domingo. It obtained so much celebrity, that the exhibition of mercury was discontinued for a considerable length of time[1], and even in the eighteenth century its specific powers over this disease were maintained by Boerhaave: but frequent disappointments and more correct observations have shown that it possesses no powers of eradicating the venereal virus; and that it is useful, only after a successful mercurial course, for repairing the strength and vigour of the system; " and where a thickened state of the ligaments, or of the periosteum, remains, or where there are foul indolent ulcers[2];" or in suspending the progress of some of the secondary symptoms for a short time, as ulcers of the tonsils, eruptions, and nodes. The decoction of the wood has been found more useful in cutaneous diseases, scrofulous affections of the membranes and ligaments, and in ozæna. The guaiac itself is an efficacious remedy in chronic rheumatism and arthritic affections, as well as those diseases for which the decoction of the wood is usually given; and in every respect it may be regarded as the active ingredient of the wood. Its sensible effects are a grateful sense of warmth in the stomach, dryness of the mouth, and thirst, with a copious flow of sweat, if the body be kept externally warm, or if the guaiac be united with opium and antimonials; but when the body is freely exposed, instead of producing diaphoresis, it augments considerably the secretion of urine. It may be exhibited either in substance or in tincture. The dose is from grs. x. to ʒſs, in the form of pills or of bolus: or made into an emulsion with water by means of mucilage or yolk of egg. Larger doses purge.

Officinal preparations. Of the wood — *Decoctum Guaiaci comp.* E. Of the guaiac — *Mistura Guaiaci.* L. *Tinctura Guaiaci* L. E. D. *Tinctura Guaiaci ammoniata.* L. E. D.

HÆMATOXYLON.[3] *Spec. Plant. Willd.* ii. 547.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Lomentaceæ *Linn.* Leguminosæ *Juss.*

G. 830. *Calyx* five-parted. *Petals* five. *Capsule* lanceolate, one-celled, two-valved, with the valves boat-shaped.

Species 1. H, *campechianum.* The Logwood-tree. *Med. Bot.* 2d. *ed.* 455. *t.* 163.

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[1] It was then sold for seven gold crowns a pound.

[2] *Pearson's Observations on the Effects of various Articles of the Materia Medica in the cure of Lues venerea,* p. 10.

[3] From αἷμα blood, and ξυλον wood. *Millar's Dictionary.* The trivial name *Campeohianum,* and the English term *Campechi* wood originated from *Palo Campechio,* the name imposed by the Spaniards who first discovered the wood.

Officinal. HÆMATOXYLI LIGNUM. *Lond. Edin. Dub.* Logwood.

Syn. Bois de Campeche (*F.*) Kampesch-holz; Blauholz (*G.*) Campeggio (*I.*)

This tree is a native of South America, and attains to great perfection at Campeachy, in the bay of Honduras. It was introduced into Jamaica in 1715, and from its quick growth now grows in an abundance which much incommodes the landholders in the neighbourhood of Savannah la Mar; flowering in March and April.[1] The stem and branches are generally crooked, the former is seldom above twenty inches thick; and the tree scarcely ever rises more than twenty-four feet in height. It is covered with a dark-coloured rough bark; and has many smaller ramifications, which are close, prickly, and beset with strong spines. The leaves are abruptly pinnate, each composed of four or five pairs of sessile, obcordate, obliquely nerved leaflets. The flowers are in terminal spicular clusters: the calyx consists of brownish purple-coloured oblong obtuse segments; the petals are spreading, obtusely lanceolate, and of a reddish yellow colour. The stamens are downy, tapering, shorter than the corolla, with small oval anthers; the fruit is a double-valved pod, containing five or six small flat reniform seeds.

Logwood is brought to this country in logs, which are afterwards chipped. Those pieces which have a deeper colour are to be preferred. It is much employed as a dye-wood.

Qualities. — This wood is inodorous, but has a sweet astringent taste. It is hard, compact, heavy, and of a deep red colour, which it gives out both to water and alcohol. The recent infusions made with distilled water are yellow, but those with common water have a reddish purple colour, which is deepened by the alkalies, and changed to yellow by the acids. They form precipitates with the sulphuric, nitric, muriatic, and acetic acids; solutions of alum, sulphates of iron and of copper, acetate of lead, and tartarized antimony[2]; which are therefore incompatible in prescriptions with these infusions and decoctions. The colour of the precipitates varies; those with the acids are reddish brown, with alum and tartarized antimony violet, with sulphate of iron blueish black, sulphate of copper purplish blue, acetate of lead reddish black, and sulphate of magnesia, purple. According to Chevreul, logwood contains a volatile oil, tannin, two kinds of colouring matter, one of which is soluble both in water and alcohol, the other soluble in alcohol only; acetate of lime and of potash.[1]

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[1] It was cultivated in this country by Mr. Miller in 1739; but is not now found in our hot-houses.

[2] When an infusion or decoction of logwood is kept for some time it becomes capable of producing a precipitate with gelatine; but when recent, no such effect takes place either with glue or isinglass. This was first observed by Dr. Bancroft.

Medical properties and uses.—Logwood is supposed to be astringent: but this is a questionable opinion, for although it produces an ink with sulphate of iron, it possesses no acerbity, and does not produce a precipitate with gelatine.[2] It is employed in diarrhœa, and in the latter stage of dysentery; but the extract is more usually ordered. It has the advantage of giving tone to the general system, and thus obviates the lax state of the intestines. The decoction may be taken in doses of two or three fluid ounces, frequently repeated.

Officinal preparation. *Extractum Hæmatoxyli.* L.

HELLEBORUS. *Spec. Plant. Willd.* ii. 1335.

Cl. 13. *Ord.* 6. Polyandria Polygynia. *Nat. ord.* Multisiliquæ *Linn.* Ranunculaceæ *Juss.*

G. 1089. *Calyx* none. *Petals* five or more. *Nectaries* bilabiate, tubular. *Capsules* many seeded, nearly erect.

Species 3. H. *niger.* Black Hellebore. *Med. Bot. 2d ed.* 473. *t.* 169.

Species 6. H. *fœtidus.* Fœtid Hellebore, or Bear's foot. *Med. Bot. 2d ed.* 477. *t.* 170. *Smith Flor. Brit.* 598. *Eng. Bot. t.* 613.

1. HELLEBORUS NIGER.

Officinal. HELLEBORI NIGRI RADIX. *Lond.* HELLEBORI NIGRI RADIX. *Edin.* ——; (MELAMPODIUM[3]) RADIX. *Dub.* The root of Black Hellebore.

Syn. Hellebore (*F.*) Schwartze Niesswurzel (*G.*) Ellebro negro (*I.*) Helleboro negro (*S.*) Kāli Koothie (*H.*) Khurbuc usivud (*Arab.*)

Black hellebore, so named from the dark colour of the root, is a native of Austria, the Apennines, and Italy; flowering from December till March; whence it has been called Christmas rose, and has obtained a place in our gardens.[4] The root is perennial, transverse, rough, knotted, externally black, internally whitish, and sends off many depending fibres. The leaves, which are deep green, spring directly from the root on long maculated petioles; and are composed generally of five leaflets, pedate, two being supported on one partial petiole on each side, and one terminal: the leaflets are ovato-lanceolate, smooth, shining, and coriaceous, with the upper half of each sparsely serrated. The flower-stalks are scapes, six or eight inches long, erect, round, somewhat tapering, sheathed, variegated with red, and bearing one or two flowers. The floral leaves supply the place of a calyx, are oval, and indented at the apex. The corolla consists of five large, roundish, concave, spreading petals, at first white, with a tint of red, deepened by age, but finally changing to green, after the pollen is shed, and the seed impregnated. The nectaries are greenish yellow, tubular, two-lipped, the upper lip longer and slightly emarginate, the lower finely notched. The filaments are numerous, and thread-like, with yellow anthers. The germens, which vary in number from four to eight, become beaked pods, containing many oval, black, shining seeds.

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[1] *Annales de Chimie*, lxvi. 254. *Thomson's Chemistry*, v. 206.

[2] Vide *Bancroft. Phil. of Permanent Colours*, 2d ed. v. ii. p. 395.

Named from Melampus, a soothsayer, who first gave it as a purgative.

[4] It was first cultivated in Britain by Gerarde in 1596.

This plant has been supposed to be the *hellebore* of Hippocrates, but there is every reason for agreeing with Willdenow, that his fifth species, Helleborus *orientalis*, is the drug of the ancients. It was found by Bellonius and Tournefort[1] growing in plenty about Mount Olympus, and the island Anticyra, which was formerly celebrated for its production. Sometimes the roots of Helleborus *viridis*, Adonis *vernalis*, Trollius *europæus*, Actæa *spicata*, Astrantia *major*, and Aconitum *neomontanum*, are either ignorantly or fraudulently substituted for those of black hellebore. These are distinguished chiefly by their colour being paler than the roots of the hellebore.

Qualities.—The fibres of the roots, which are the parts used in medicine, are about the thickness of a straw, from four inches to a foot in length, corrugated, of a deep brown black on the outside, and internally white or yellowish. They have an unpleasant odour; and a nauseous, bitterish, acrid taste, benumbing the tongue, and leaving upon it an impression, "as when it hath been a little burnt with eating or supping any thing too hot."[2] The acrimony is impaired by keeping; and appears to depend on a volatile matter, as water distilled from the root has an acrid taste. Both alcohol and water extract its medicinal properties; and, as the spirituous preparation is the most active, these appear to depend on its resinous part. By coction with water it yields a very considerable portion of gummy matter and some resin. (See the extract.)

Medical properties and uses.—Black hellebore root is a drastic cathartic, and on this property probably depends its emmenagogue and hydragogue powers. In smaller doses it is supposed to act as an alterative. It has been much celebrated in mania, melancholia, dropsy, scabies, and worms; but does not appear to possess any particular advantages over the other resinous purgatives, which act with less virulence. As an emmenagogue it is useful in plethoric habits, when preparations of iron are contra-indicated. When black hellebore is taken in too great quantity, it occasions violent vomitings, inflammation of the stomach, and death. These effects are to be obviated by evacuating the stomach, by drinking copiously of mild mucilaginous fluids, and then employing the most powerful antiphlogistic measures. It is seldom prescribed in substance; but either in the form of tincture, or of extract, or of decoction made with two drachms of the root to a pint of water.[1] The dose of the root is from grs. x. to ℈j, which purges strongly; but to produce its other effects two or three grains are sufficient. Of the decoction f℥j may be given every four hours.

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[1] *Bellonii Obs.* l. iii. c. 21. *Tournefort, Voyage,* ii. let. 21. p. 189.

[2] Grew.

Officinal preparations. *Tinctura Hellebori nigri.* L. E D. *Extractum Hellebori nigri.* E. D.

2. HELLEBORUS FŒTIDUS.

Officinal. HELLEBORI FŒTIDI FOLIA. *Lond.* HELLEBORASTER; FOLIA. *Dub.* The leaves of Fœtid Hellebore.

Syn. Héllebore fœtide (*F.*) Stinkende Niesswurzell (*G.*) Elleboro fetido (*I.*) Helleboro hediondo (*S.*)

This is a perennial indigenous plant, growing under hedges and in shady places, on a chalky soil, flowering in March and April. The root is small, and bent, with a great many slender dark-coloured fibres. The stem is about eighteen inches high, round, strong, naked, divided and subdivided into branches, and compressed towards the top. The leaves, which stand upon long channelled footstalks, surrounding the middle of the stem, are of a deep lurid green colour, and pedate: the leaflets long, narrow, lanceolate, obscurely serrated, generally nine in number, four united at their bases on each side, and one terminal. At each ramification of the flower-stem is a stem-clasping broad stipule, or scaly leaf, trifid at the place where the stem first branches, then bifid, and at the ultimate subdivisions entire, oval, and pointed; those on the flowering stem are of a much paler green than the proper leaves. The flowers are numerous, terminal, peduncled, and pendent: the petals are five, two of which are oval, and the other three heart-shaped; the whole concave, persistent, of a pale green colour tipped with a claret purple: the nectaries are five or eight, similar to those of the black hellebore. The stamens are numerous, and flat at the base, the length of the petals, with white anthers; the germens three or more, becoming beaked pods, containing round black seeds.

These roots were long used as domestic worm medicine, before they were introduced into the list of materia medica by the London College.[2]

Qualities.—The odour of the recent plant is fœtid, the taste of the leaves when chewed bitterish, biting, and so acrid as to excoriate the mouth. The stipules possess these qualities in a greater degree than the proper leaves.

Medical properties and uses.—The leaves of fetid hellebore are strongly cathartic and emetic; and in overdoses prove highly deleterious. They have been successfully, although they are now rarely, used as an anthelmintic against the lumbricus teres, for which they were strongly recommended by Dr. Bissett; and Woodville tried them with advantage upon a girl of twenty years of age, in the Middlesex Dispensary. They are given dried in the form of powder; or a decoction made by boiling ʒij of the recent leaves, or ℥ſs of the dried, in f℥viij of water for fifteen minutes; or a syrup made with the expressed juice of the recent leaves moistened with vinegar, which is supposed to correct the violent effects of the drug.

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[1] Wintringham, *Thesaurus Med.* p. 87.

[2] "Probably upon the authority of Dr. Bissett." *Med. Bot.* 478.

The dose of the powder is from grs. vj to ℈j; of the decoction from f℥j; and of the syrup a tea-spoonful at bed-time, and one or two in the morning, to children betwixt two and six years of age, on two or three successive days.

HERACLEUM. *Spec. Plant. Willd.* i. 1421.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 541. *Fruit* elliptical, emarginate, compressed, striated, margined. *Corolla* difform inflex emarginate. *Involucre* caducous.

Species H. *gummiferum.* Gum-bearing Heracleum. *Willd. Hortus Berolin.* i. *t.* 53, 54.

Officinal. AMMONIACUM. *Lond. Edin. Dub.* Ammoniac.

Syn. Gomme Ammoniaque (*F.*) Ammoniak (*G.*) Gomma Ammoniaco (*I.*) Amoniaco (*S.*) Ushok (*Arab.*)

The plant which yields this gum-resin is a native of Africa, and the East Indies. It has not been scientifically described by any one who has seen it growing in its native soil[1], and the description which is about to be given, is that of a plant which Willdenow reared from seed found in the ammoniacum of the shops, and has named Heracleum gummiferum. The London College, on his authority, has admitted it as the ammoniacum plant; it flowers in June and July. The root is tapering, a span in length, fleshy, whitish, and twice divided at the apex. The stem rises three feet in height, is branched, erect, about an inch thick at the base, deeply furrowed, and sparsely furnished with hairs. The branches are opposite and divaricated. The radical leaves are a span in length, cordate, three-lobed, toothed, pubescent on the under surface, and supported on roundish, channelled, furrowed, petioles: the stem-leaves are opposite, somewhat cordate, three or four inches long, toothed, on petioles, the margin of the base of which is leafy, ventricose, and sheathing. The umbels are large and many-rayed, composed of many-flowered convex umbellules. The involucre is polyphyllous, with the leaflets linear, lanceolate, and deciduous; as are also the involucels, which, however, are persistent. The marginal flowers are hermaphrodite and rayed, the central hermaphrodite without the germen. The margin of the calyx is obsolete. The *marginal* flowers have a pentapetalous unequal corolla, the two outer petals being large, dilated, and somewhat cordate; and the three inner inflex cordate, and half the size only of the others. The *central* flowers are pentapetalous, equal, with inflex cordate petals. The filaments are five, capillary, with roundish anthers. There is no germen in the central flowers, but in the marginal it is oblong, inferior, and crowned with two short styles inserted into a glandular body, with capitate stigmas. The fruit is oblong, slightly emarginate, consisting of two striated seeds, convex on one side, and on the other plane.

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[1] Mr. Jackson has seen and described the plant, of which he has also given a figure, but neither can be regarded as scientifically correct; and of course not authority to be relied on. *Account of Marocco,* p. 83.

Willdenow could not obtain any of the gum-resin, from this plant; but he has no doubt of its being the plant from which it is obtained. Mr. Jackson, in his account of Marocco, informs us, that the ammoniacum plant, which in the Arabic is named *feshook*, resembles the fennel[1], is ten feet in height, and one inch thick in the thickest part of the stem. The plant grows at El-araiche and M'Sharrah Rumellah; and neither bird nor beast is seen near the spot, but it is attacked by a horned beetle which perforates the stem with its horn, and the juice runs out at the wound. The ammoniacum is, however, procured by incisions also, and allowed to drop on the ground, where it hardens by the air and sun; on which account that from Barbary is mixed with a red earth, and is not saleable in the London market. The best ammoniacum is brought from the East Indies, packed in cases and chests. It is in large masses composed of small round fragments or tears; or in separate dry tears, which is generally considered a sign of its goodness.

Qualities.—Ammoniacum has a peculiar faint but not ungrateful smell; and a bitter nauseous sweet taste. The tears are yellow on the outside, and white within; brittle, and break with a vitreous fracture. Their specific gravity is 1·207. Ammoniacum is adhesive in the warm hand, softens by heat, but does not melt; and is partially soluble in water, alcohol, ether, solutions of alkalies, and vinegar. When triturated with water the solution is milky, but after some time it lets fall a resinous matter; which is the part of the ammoniacum that is taken up by ether and alcohol. Water or alcohol, when distilled off ammoniacum, bring over nothing from it. According to the analysis of Braconnot, it is composed of 70·0 parts of resin, 18·4 gum, 4·4 glutinous matter, and 6·0 water, in 100·0 parts; 1·2 parts being lost in the analysis.[1] I find that sulphuric ether takes up six grains in ten of ammoniacum, and when evaporated, leaves a yellowish white resin[2], which is long of hardening, and is insipid, although it possesses the odour of the gum-resin: the taste resides in the gum, which in other respects possesses the properties of acacia gum. Water, therefore, is the proper menstruum for ammoniacum.

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[1] Both Dioscorides and Pliny describe ammoniacum as the juice of a species of ferula growing in Libya. *Dioscor.* l. iii. c. 98. *Plin.* l. xii. c. 23.

Medical properties and uses.—Ammoniacum is a stimulating expectorant, deobstruent, and antispasmodic; and is in large doses purgative. Externally it is discutient and resolvent. It is prescribed with advantage in asthma, chronic catarrh, and some other pulmonary affections; but, on account of its stimulating properties, its use must be avoided where any inflammatory action of the chest is going forward. As a deobstruent it is useful in visceral obstructions, hysteria, and chlorosis: and in that peculiar state of the bowels often accompanying hypochondriasis and dyspepsia, in which there is an almost constant degree of colic, particularly after taking food, and which appears to arise from a viscid mucus lodged in the intestines, a combination of ammoniacum and rhubarb is singularly efficacious. As an antispasmodic, Cullen properly considers it as the least powerful of the fetid gums. It may be combined with tartarised antimony, squills, assafœtida, and ipecacuanha, to promote its expectorant powers; and with myrrh, iron, and bitters, when its deobstruent properties are required. It is given either in substance, or diffused in water in the form of emulsion. Externally, it is applied under the form of plaster to scirrhous tumours and white swellings of the joints. (See *Preparations and Compositions.*)

The dose of ammoniacum is from grs. x. to grs. xxx.

Officinal preparations. *Mistura Ammoniaci.* L. D. *Emplastrum Ammoniaci.* L. *Emplastrum Ammoniaci cum Hydrargyro.* L.

HIRUDO.[3] *Syst. Nat. Gmelin.* i. 3095.

Cl. 6. *Ord.* 1. Vermes intestina.

G. 280. Body oblong, truncated at both extremities, cartilaginous, moving by dilating the head and tail.

Sp. 2. H. *medicinalis.* The Medicinal leech. *Amœnit. Academ.* vii. 40.

Officinal. HIRUDO MEDICINALIS. *Dub.* The Leech.

Syn. Sang sue (*F.*) Blutiul; Ægle; Lake (*G.*) Sanguisuca; Mignatta (*I.*) Sanguijuela (*S.*) Khéruheen (*Arab.*) Jonc (*H.*) Jelauca (*Sanc.*)

This species of leech is common throughout Europe, inhabiting lakes and stagnant pools. The body is about three inches long, tapering towards the head, composed of rings, and capable of being very much lengthened and contracted. The colour of the back is dark olive, divided by four yellow or buff-coloured longitudinal lines, two of which are lateral, with a black line running through their centres; and the other two, which are on the upper part of the back, dividing it into three nearly equal parts, are broken with black. Within these lateral and upper lines are two others, which appear like chains of black and yellow. The belly is pale olive, thickly maculated with black or very dark blue irregular spots. The mouth is triangular, placed in the centre of a horse-shoe sucker which is under the head; and at the anal extremity is a broad circular sucker, by which it attaches itself to different bodies.

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[1] *Annales de Chim.* lxviii. 69. *Thomson's Chemistry*, v. 143.

[2] Nitric acid converts this resin into a yellow matter, which imparts a permanent yellow colour to silk.

[3] Named from *haurio*, expressive of its well known peculiar action.—*Johnson's Treatise*, p. 40.

Leeches are oviparous. All the ova are discharged in one involucre, near the surface and the margins of pools, and are hatched by the heat of the sun. They do not cast the skin, as has been generally supposed; but at certain times throw off a tough slimy substance from their bodies, apparently the production of disease; and from which they get disincumbered by drawing themselves through between the moss and the matted roots of rushes.[1] During winter they remain almost torpid, hid amongst the thick network of aquatic roots which surround the pools.

Norfolk supplies a great part of the leeches which are brought to the London market; some are taken also in Suffolk, Hampshire, Kent, Essex, and Wales, but many are imported from Bourdeaux and Lisbon.[2] They are caught in spring and autumn by people who wade into the pools and allow them to fasten on their limbs; or more generally, the catchers beat, as they wade in, the surface of the water with poles, which sets the leeches in motion, and brings them to the surface; when they are taken with the hand and put into bags. As they come to the surface just before a thunder storm this is regarded as a good time for collecting them. They are best preserved in vessels half filled with soft water, kept in an equal and moderate temperature, (50° Fahr.) and covered over with a coarse cloth, so as to admit the air. The water should be changed once a week; and all the dead or sickly leeches removed from the general stock, for they are subject to much disease and great mortality. Leeches which have been used should not be returned to the stock till they appear to have completely regained their health and vigour, which is known by their feeling hard and firm when handled. As we are ignorant of their proper and natural food, it is useless to attempt to feed them[1]; but in winter it would perhaps be advantageous to put some moss into the vessel in which they are preserved.

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[1] I give this on the authority of Mr. Dickson of Covent Garden, who has made many curious observations on the œconomy of the leech.

[2] These differ from English leeches chiefly in having the belly of one uniform colour.

Medical uses. — Leeches appear to have been first used by Themison. They are applied in cases where local blood-letting is necessary, as in ophthalmia, and particularly to places where cupping-glasses cannot be applied. In some habits, where there is a disposition to erysipelatous inflammation, their bites, which are triangular, occasion a considerable degree of irritation, and œdematous swellings follow, which are exceedingly troublesome; but in general they easily heal, and occasion no inconvenience. It is sometimes exceedingly difficult to make them bite, which they never will do when they are sick. The best mode of applying them, is to take them out of the water for some minutes before they are to be used, and to dry them well with a very soft cloth directly before they are applied. The part should also be well cleaned with soap and water, then washed with a little pure water, and made very dry. If there are any hairs on the spot, these must be close shaved. I have found this method preferable to that of wetting the part with milk and sugar, blood, or any other matter. When they, nevertheless, will not readily fix, or when it is wished to apply them very exactly on a particular spot, as, for instance, close to the angle of the eye in ophthalmia, Dr. Johnson recommends to puncture the part with a lancet; but I find that putting them into a large quill cut at both ends, and applying the end at which the head of the animal lies to the part, with the finger over the other end, is a never-failing mode of making them bite. The quill is withdrawn after they are firmly fixed. They drop off spontaneously, whenever they have gorged themselves with blood; and they may be separated at any time by sprinkling a little salt on the head. Very few leeches can draw more than half a fluid ounce of blood; and therefore it is necessary, in order to increase the quantity, to keep the orifices bleeding, by bathing them with hot water. It has been recommended to cut off the tail of the leech, so as to allow the blood to be discharged as fast as it is sucked, the leech continuing to suck notwithstanding this mutilation. After leeches drop off, the application of a little salt makes them disgorge all the blood they have sucked; and if they be immediately thrown into clean water, and this repeatedly changed for three or four times, they soon recover their health and vigour. Dr. Johnson advises the use of vinegar instead of salt, which is not apt to blister the lips as salt does, preventing it from sucking for some considerable time.

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[1] Dr. Johnson says they live by adhering to and sucking the fluids of fish, frogs, &c.; but they take no kind of solid food. *Treatise on the Medicinal Leech,* p. 61.

HORDEUM *Spec. Plant. Willd.* i. 472.

Cl. 3. *Ord.* 2. Triandria Digynia. *Nat. ord.* Gramineæ.
G. 151. *Calyx* lateral, two-valved, one-flowered, three-fold.
Species 3. H. distichum. Common Barley. *Viborg-Cereal.* 35 t. 3.
Officinal. HORDEI SEMINA *Lond.* HORDEI DISTICHI SEMINA. *Edin.*
HORDEUM DISTICHUM; SEMINA. *Dub.* Barley.
Syn. Orge (*F.*) Gerstengraupen (*G.*) Orzo (*I.*) Cebada (*S.*) Iow (*H.*) Bārlee Arise (*Tam.*)

Barley is asserted by Reidesel to be a native of Tartary, but the fact is not well ascertained.[1] It is an annual plant, and cultivated in almost every country of Europe. This species, which is the most generally cultivated in Britain, has a long flat spike or ear, with a double row of defective or male florets on each flat side, and a single row of fertile florets at each edge. The valves of the calyx, or outer chaff, are linear, and one half shorter than the corolla or inner chaff, which terminates in a straight, serrated awn or beard sixteen times its own length. When ripe the husk is coriaceous, angular, and continues close about the grain, which, when freed from it, is ovate, grooved, and angular.

Barley is used as an article of food, but less so than it was in former times; and it is now chiefly cultivated for the purpose of forming malt liquors and ardent spirits. It is formed into pearl barley by two different operations: the barley is first spread out and moistened; and then, in this state, by means of machinery is denuded of the cuticle, or shelled. It is afterwards rounded in a mill, which at the same time polishes the little granules into which it is formed.

Qualities. — Pearl barley is inodorous, and has a slightly sweetish taste. It consists of roundish granules of a pearly whiteness, composed almost entirely of starch, with some gluten, mucilage, and saccharine matter[2], which are dissolved in boiling water. The decoction very soon runs into the acetous fermentation. Barley is never used medicinally in substance.

Officinal preparations. — *Decoctum Hordei.* L. E. D. *Decoctum Hordei compositum.* L. D.

HUMULUS. *Spec. Plant. Willd.* iv. 769.

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[1] Cardan asserts that it is a native of Athol in Scotland. Diodorus Siculus refers it to Egypt, where, he says, Osiris found it wild, and first cultivated it.

[2] Einhof, who analysed barley both in the unripe and ripe state, found that 3840 parts of barley in grain afforded 430 of a volatile matter, 720 husk, and 2690 of meal; and from the same quantity of barley meal he obtained 360 of *volatile matter*, 44 *albumen*, 200 *saccharine matter*, 176 *mucilage*, 9 *phosphate of lime*, with some *albumen*, 135 *gluten*, 260 *husk*, with some *gluten* and *starch*, and 2580 of *starch*: 76 parts were lost in the analysis. When this meal is macerated in alcohol it yields a yellow-coloured acrid thick oil, which is supposed to give the peculiar flavour to spirits from raw grain, and to be lost in malting. *Thomson's Chemistry*, v. 254.

Cl. 22. *Ord.* 5. Diæcia Pentandria. *Nat. Ord.* Scabridæ *Linn.* Urticæ *Juss.*

G. 1795. *Male. Calyx* five-leaved. *Corolla* 0.
Female. Calyx. one-leafed, obliquely spreading, entire, *Corolla* 0. *Styles* two. *Seed* one, within a leafy calyx.

Species 1. H. *Lupulus.* The Hop. *Eng. Bot. t.* 427.*Smith's Flor. Brit.* 1077.

Offi. HUMULI STROBILI. *Lond. Edin.* The strobiles of the Hop.
Syn. Houblon grimpant (*F.*) Hopfen (*G.*) Luppolo (*I.*) Hoblon (*S.*)

The hop is an indigenous perennial plant growing in hedges, and flowering in July. It is very abundantly cultivated in Kent, Essex, Surry, and Suffolk; and the strobiles are picked about the end of August or the beginning of September.[1] The root sends up many long, striated, angled, rough, flexible stems, which support themselves by twining round upright bodies in a spiral direction from left to right. The leaves are opposite in pairs, petiolate, heart-shaped, serrated, entire, or lobed, and of a dark green colour on the upper disk. Both the leaves and petioles are scabrous, with minute prickles; and at the base of each leafstalk are two interfoliaceous, entire, reflected, smooth stipules. The flowers are axillary, and furnished with bractes: the males are yellowish white, in panicles and drooping: the females, which are on distinct plants, are in solitary cones or strobiles, ovate, and pendulous; composed of membranous scales of a pale greenish colour, tubular from being rolled in at the base, and two-flowered, each containing one round flattish seed, of a bay-brown colour, surrounded with a sharp rim, and compressed at the tip.

At the proper season, while the strobiles are yet scarcely ripe, the plants are cut about three feet from the ground, the poles on which they are twined pulled up, and the strobiles carefully picked off, one by one. Those that are over-ripe or defective are separated from those that are ripe enough, and both kinds are carried to the kiln as soon as possible after they are picked. The heat of the kiln requires to be regulated with great nicety; and in order to prevent them from drying too fast, many kilns have two floors, on the uppermost of which the greener hops are laid, and gradually dried before being brought to support the heat of the lower floor.[2] Charcoal is the fuel usually employed: other kinds of fuel injuring the flavour of the hops. The strobiles are considered sufficiently dried when they become crisp; but they acquire a degree of toughness and tenacity before they are bagged, from being laid in heaps in the store-houses. Five pounds of moist or under-ripe hops make one pound only when taken from the kiln. The best hops are brought to market in fine canvas sacks called "pockets," each of which contains about 1¼ cwt. of hops.

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[1] The culture of the hop plant was introduced into England from Flanders in 1524; and the strobiles were first used for preserving English beer in the latter part of the reign of Henry VIII; but the prejudice against them was very considerable, and the city of London, a hundred years afterwards, petitioned the parliament to prevent their use. There are now, however, severe penalties inflicted on brewers who use any other bitter for preserving their beer.

[2] This is the case at Farnham in Surry. See *Stevenson's Survey*, 363.

Qualities.—Hops have a strong, peculiar, fragrant, sub-narcotic odour, and a very bitter, aromatic, astringent taste. They have a pale greenish yellow hue, appear like thin transparent veined leaves; and although not tough, yet are difficult to pulverize. Their virtues are extracted by boiling water, or alcohol, or ether. The watery infusion has a pale straw colour, is rendered muddy by the mineral acids; alkalies deepen its colour; it strikes an olive with sulphate of iron; is precipitated by alcohol, solutions of superacetate of lead, nitrate of silver, and tartarized antimony: and when rubbed with magnesia or lime, a rod dipped in muriatic acid discovers the presence of ammonia. The ethereal tincture, when evaporated on water, leaves a pellicle of greenish intensely bitter resin, and deposits some extractive. By distillation in water, hops yield a volatile aromatic oil. From these experiments they appear to contain resin, extractive, mucilage, volatile oil, tannin, an ammoniacal salt, and what has been termed the bitter principle.

Medical properties and uses.—Hops are narcotic, tonic, diuretic; and, externally applied, anodyne and discutient. Their use as a preservative of beer has been long known, and also their narcotic powers in procuring sleep in the delirium of fever, and in mania, when used as a pillow; and owing to this effect having been lately confirmed, their efficacy as a general narcotic, when introduced into the stomach, has been investigated.[1] Dr. Maton observed that, besides allaying pain and producing sleep, the preparations of hops reduce the frequency of the pulse, and increase its firmness in a very direct manner. One drachm of the tincture and four grains of the extract given once in six hours, reduced the pulsations from 96 to 60 in twenty-four hours.[2] He found the extract exceedingly efficacious in allaying the pain of articular rheumatism, and our own experience has not ultimately afforded us sufficient proof of its utility as a sedative, and Dr. Bigsby's[3] experiments have lessened very much the confidence practitioners were disposed to give to it; and we are rather surprised that the Edinburgh College has adopted it into their list of Materia Medica. An ointment compounded with the powder of the hop and lard is recommended by Mr. Freake as an anodyne application to cancerous sores. We have seen a fomentation of it afford much relief in painful swellings and tumours. It may be given in the form of powder, infusion, tincture, or extract. The dose of the powder is from grs. iij. to ℈j; that of the infusion, which is made with ℥ſs of the hops and Oj of boiling water, f℥jſs with f℥ſs of cinnamon water, twice or thrice a day.

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[1] *De Roche's. De Humuli Lupuli Viribus medicis.*

[2] *Observations on the Humulus Lupulus, &c. by A. Freake.*

[3] Vide *London Medical Repository*, vol. v. p. 97.

Officinal preparations — *Extractum Humuli.* L. *Tinctura Humuli.* L. E.

HYDRARGYRUM.[1] Mercury or Quicksilver.

Syn. Mercure (*F.*) Quicksilber (*G.*) Mercurio (*I.*) Azógue (*S.*) Abue (*Arab.*) Pára (*H.*) Párada (*San.*)

This metal is found in Spain, Germany, and Hungary; Siberia, the Philippines, China, and Peru. The most productive mines are those of Idria, Carinthia, and the Palatinate; Almaden near Cordova in Spain[2], and Guanca Velica near Potosi in Peru.[3] It is procured

A. In its metallic state:

i. Unalloyed	Sp. 1. *Native mercury.*
ii. Alloyed with silver.	2. *Native amalgam.*
iii. With sulphur.	3. *Cinnabar.* Var. *a.* Dark red. *b.* Bright red.
	4. *Hepatic mercurial ore.* Var. *a.* Compact. *b.* Slaty.

B. Oxidized.

iv. Combined with the muriatic and a portion of sulphuric acid.	5. *Corneous mercury.*

Native quicksilver is found either in globules, disseminated on the surface, or collected in the crevices of other mercurial ores, and in marlite, calcareous spar, or other fossils. It has the lustre, opacity, fluidity, and other qualities of the pure metal; but owing to the small quantity which is found of it, the quicksilver of commerce is usually obtained from cinnabar. This ore is red, varying in the shades of its colour and in the degrees of its lustre. It occurs massive, disseminated, and crystallized; in the two former states always opaque, and in the latter translucent, or transparent. To obtain the metal, the ore, after being sorted, is reduced to powder, and mingled with about one-fourth of quicklime in powder. This mixture is put into large iron retorts, which are placed in a long furnace, and glass receivers adapted to each, but not luted until all the moisture it contains be driven off; the joinings of the vessels are then closely stopped with well-tempered clay, and a full red heat kept up for seven or eight hours, in which time the mercury is volatilized, and condensed in the receiver. About ten ounces of mercury are usually obtained from 100lbs. of the ore.[1]

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[1] Ὑδράργυρος Græcorum.

[2] This is the oldest and the richest mine of Cinnabar in Europe. It was wrought by the Romans two thousand years ago: and yields about 6000 quintals of fluid mercury annually.

[3] These were discovered in 1566 and 1567, by Henry Garces, a Portugueze.

Officinal. HYDRARGYRUS. *Lond. Edin.* HYDRARGYRUM. *Dub.* Quicksilver.

Syn. Mercure coulant (*F.*) Vide *Hydrargyrum.*

The greater part of the quicksilver which is used in this country is brought from Germany, in leathern skins, each of which contains from 60lbs. to 1 cwt. of the metal; and two or three of these are generally packed together in one cask. Sometimes, however, it is brought over in iron bottles. It is often adulterated by the admixture of lead, bismuth, zinc, or tin: and when the metal quickly loses its lustre, is covered with a film, or is less fluid and mobile than usual, leaves a stain on a delft plate, or does not readily divide into round globules, but into those with tails, it may be suspected. Lead is discovered by dissolving a portion of the suspected mercury in nitric acid, and adding to the solution water saturated with sulphuretted hydrogen gas, which gives a brown precipitate if it be present; and by this means one part of lead may be detected in 15260 of mercury. Bismuth is detected by pouring the above-mentioned nitric solution into distilled water, when the bismuth will appear as a white precipitate. Exposing the mercury to heat detects zinc; and tin is discovered by a weak nitro-muriatic solution of gold, which is precipitated purple by tin. It is purified by distillation with iron-filings; or by agitation in diluted sulphuric acid, until the acid ceases to become turbid; and then, after washing and drying the globules into which it has been divided, passing them through a pin-hole in the bottom of a funnel of writing paper.[2]

Qualities.—Pure mercury is inodorous, insipid, and of a bright white or silver colour. Its specific gravity is 13.568.[3] It is always fluid at the ordinary temperature of the atmosphere; but becomes a solid malleable metal in a degree of cold sufficient to sink the thermometer to 39° below 0 of Fahrenheit.[4] It boils at 656°, and is volatilized unchanged in close vessels, but is not capable of combustion.[5] Mercury is oxidised by the air at its usual temperature, when subject to agitation; and is fully saturated with oxygen in a continued heat of 600°. It is oxydized by, and combines with, the sulphuric, nitric, and oxymuriatic acids; and its oxides also enter into combinations with the other acids. It unites with sulphur and phosphorus; and combines with many other metals, forming what are called amalgams.

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[1] *Aikin's Chemical Dictionary.*

[2] This method was invented by Professor Brunehi, of Pisa. Vide *Phil. Mag.* iv. p. 348.

[3] Cavendish.

[4] Crichton. *Phil. Mag.* xiv. 49.

[5] *Thomson's Chemistry*, i. 175. If, however, the galvanic fluid be passed through it, the beautiful luminous stars in which it is dispersed seem to prove its combustibility.

Medical properties and uses.—Mercury in its metallic state exerts no action on the animal system. It has nevertheless been administered in doses of a pound or more with the view of operating mechanically, and overcoming by its weight the obstruction of the intestines which exists in ileus: but as it cannot act by its gravity on the ascending part of the bowels, it is not easy to conceive how it should have been ever recommended; and the events of the cases in which it has been given have sufficiently proved the futility of the practice.

Mercury, however, when prepared for medicinal use, is a remedy of the most extensive application. It is a powerful and general stimulant, but its effects are certainly different from those of other articles which are ranked in the same class. It enters into the circulation, quickens the vascular action, and excites powerfully the whole of the glandular system; increasing all the secretions and excretions. It has been supposed, that it is peculiarly determined to the salivary glands; but if, as there is every reason to suppose, these glands are endowed with more irritability[1], it is easy to conceive that the same degree of stimulus, which is operating on the whole system, will produce a greater effect on them in a direct ratio according to their greater susceptibility. But although its general action is stimulant, yet the various preparations of it produce different effects, operating sometimes as stimulants, cathartics, or emmenagogues, and locally as errhines: and hence the great variety of diseases in which it has been found useful: as febrile affections, spasms, cachetic diseases, glandular obstructions, cutaneous eruptions, and membranous inflammation. (See *Preparations and Compositions.*)

But the most important effect of the preparations of mercury is their specific operation in syphilis. They were used, and their effects when acccumulated in the habit were known, so early as the 13th century; and the writings of Theoderick[2] contain cautions against catching cold during the course; but the first notice of mercury as a remedy in lues venerea is contained in a tract by Jo. Almenar, a Spaniard, published in 1516; who recommends it after the manner of the Arabians, but condemns pushing the remedy so as to promote salivation. Physicians, however, did not venture to give mercury internally, till Paracelsus broke the fetters of ancient authority, and proved that it might be exhibited not only with safety, but with advantage. Since his time, a period of nearly 300 years, experience has fully sanctioned its use; and, as Mr. Pearson justly observes, "not one medicine besides derived from the animal, vegetable, or mineral kingdom, has maintained its credit, with men actually employed in extensive practice during a tenth part of that period[1]:" yet, it is remarkable, that in the present day its utility in syphilis has been questioned.[2] Many various theories of the operation of mercury have been advanced; the most satisfactory of which is that of Mr. Hunter, who supposed that the stimulant operation of the mercury induces and maintains an action which is incompatible with the morbid action produced by the venereal virus, until the poison is either destroyed, or evacuated from the body by the excretions. But whatever may be the principles on which it operates, its efficacy in this disease is certain, when it is judiciously and cautiously administered. The mode of giving it, and the morbid effects which it produces under certain circumstances, shall be mentioned when its preparations are described: it is only necessary to observe further in this place, that although men of the first medical talents have occasionally declaimed against its use[3], and although much mischief may have of late years arisen from its indiscriminate employment by the temerity of the speculative, and by ignorance; yet, in the hands of judicious and cautious practitioners it will continue to rank as one of the most useful of the articles of the materia medica.

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[1] That the salivary glands and their excretories are very excitable, is evident from the flow of the saliva being much increased by affections of the mind, as the thinking of any kind of food which is particularly grateful to the taste.

[2] He was a friar, afterwards bishop of Cervia, and died between the years 1270 and 80. See *Freind's History of Physic*, ii. 360.

Officinal preparations.[4]

I. By distillation to purify the metal.
  1. *Hydrargyrus purificatus.* L. E. D.
II. By trituration; (*suboxidized.*)
  a. With animal fat.
    2. *Unguentum Hydrargyri fortius.* L. *Ung. Hydrargyri.* D.
    3. ——— *Hydrargyri.* E.
    4. ——— ——— *mitius.* L. D.
    5. *Linimentum Hydrargyri.* L.
    6. *Emplastrum Ammoniaci cum Hydrargyro.* L. D.
    ——— *Hydrargyri.* L. E.
  b. With saccharine substances.
    7. *Pilulæ Hydrargyri.* L. E. D.
  c. With carbonate of lime.
    8. *Hydrargyrus cum Cretâ.* L. D.
  d. With carbonate of magnesia.
    9. *Hydrargyrum cum Magnesia.* D.
III. By the action of heat and air; (*oxidized.*)
    10. *Hydrargyri Oxydum rubrum.* L. *Oxydum Hydrargyri.* D.
IV. By the action of acids.
  a. With sulphuric acid; (*suboxidized.*)

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[1] *Observations, &c.* p. 97.

[2] *Medico-Chirurg. Trans.* vol. ix.

[3] Saunders—*Observations on the Hepatitis of India, &c.*

[4] In forming this table, we have been much assisted by the excellent table drawn up by Doctor Duncan, jun. in The Edinburgh New Dispensatory; and we trust our alterations will render it more practically useful.

11. *Subsulphas Hydrargyri flavus*. E. *Oxydum Hydrargyri sulphuricum*. D.

b. With nitric acid; (*suboxidized*.)

12. *Unguentum Hydrargyri nitratis*. L. E. *Unguentum Supernitratis Hydrargyri*. D.

13. *Unguentum Nitratis Hydrargyri mitius*. E.

———————— (*oxidized*.)

14. *Hydrargyri Nitrico-oxydum*. L. *Oxydum Hydrargyri rubrum per Acidum nitricum*. E. *Oxydum Hydrargyri nitricum*. D.

15. *Unguentum Hydrargyri nitrico-oxydi*. L. *Unguentum Oxidi Hydrargyri rubri*. E. *Unguentum Subnitratis Hydrargyri*. D.

c. With muriatic acid.

† sublimated; (*oxidized*.)

16. *Hydrargyri Submurias*. L. *Submurias Hydrargyri mitis*. E. *Submurias Hydrargyri sublimatum*. D.

17. *Pilulæ Hydrargyri submuriatis*. L.

———————— (*oxidized and acidified*.)

18. *Oxymurias Hydrargyri*. L. *Murias Hydrargyri corrosivus*. E. *Murias Hydrargyri corrosivum*. D.

19. *Liquor Hydrargyri Oxymuriatis*. L.

†† precipitated; (*oxidized*.)

20. *Submurias Hydrargyri præcipitatus*. E. D.

d. With acetous acid; (*suboxidized*.)

21. *Acetis Hydrargyri*. E. *Acetas Hydrargyri*. D.

V. By precipitation with earths and alkalies from acid solutions.

a. By lime-water from the nitric solution; (*suboxidized*.)

22. *Hydrargyri Oxydum cinereum*. L.

b. By ammonia from the nitric solution; (*suboxidized*.)

23. *Oxydum Hydrargyri cinereum*. E. *Pulvis Hydrargyri cinereus*. D.

c. By ammonia from the muriatic solution; (*oxidized*.)

24. *Submurias Hydrargyri ammoniatum*. D. *Hydrargyrus Præcipitatus albus*. L.

25. *Unguentum Submuriatis Hydrargyri ammoniati*. D. *Ung. Hydrargyri Præcipitati albi*. L.

VI. Combined with sulphur.

a. By trituration.

26. *Sulphuretum Hydrargyri nigrum*. E. D.

b. Sublimated.

27. *Hydrargyri Sulphuretum rubrum*. L. D.

HYOSCYAMUS.[1] *Spec. Plant. Willd.* i. 1010.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Luridæ *Linn.* Solaneæ *Juss.*

G. 378. *Corolla* funnel-shaped, obtuse. *Stamens* inclined. *Capsule* covered with a lid, two-celled.

Spec. 1. H. *niger*. Common Henbane. *Med. Bot. 2d edit.* 204. *t.* 76. *Smith Flor. Brit.* 598. *Eng. Bot.* 591.

Officinal. HYOSCYAMI FOLIA ET SEMINA. *Lond.* *Hyosciami*

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[1] ʽΥος κυαμος, Hog-bane.

NIGRI HERBA; SEMINA *Edin.* HYOSCYAMUS; HERBA. *Dub.* The leaves and seeds of Henbane.

Syn. Jusquiame (*F.*) Belsenkraut (*G.*) Giusquiamo nero (*I.*) Khorassānie Ajocan (*H.*) Sickrán (*Arab.*)

Common henbane is an indigenous annual, frequent on waste grounds, and at the sides of roads, particularly on a calcareous soil, flowering in July. The root is long, tapering, compact, and fibrous; the stem erect, woody, round, and branched, rising about three feet in height. The leaves are alternate, sessile, and embracing the stem; large, the lower ones being above a foot in length; deeply sinuated, undulated, woolly, and of a sea-green colour. The flowers are in terminal, recurved, leafy simple spikes; and each is simple and erect. The calyx is permanent, pitcher-shaped, with a regular five-cleft border reticulated with veins: the corolla straw-coloured, and beautifully pencilled with a net-work of purple veins. The filaments are inserted into the tube of the corolla, tapering, downy at the base, and supporting purple anthers. The style is purplish, with a blunt round stigma. The capsule is globular, invested with the body of the calyx, bilocular, and closed with a convex smooth lid. It contains numerous small irregular brown seeds.[1]

The whole of the plant is covered with soft white hairs, feels clammy and slightly adhesive, and is poisonous when eaten.

Qualities.—The odour of the recent leaves is strong, somewhat fœtid and narcotic[2], and the taste mucilaginous, and slightly acrid: but when dry, they have scarcely either odour or taste. Its virtues are completely extracted by diluted alcohol. The watery infusion is of a very pale yellow colour, and insipid; and has the narcotic odour of the plant. It is not altered by the acids: the alkalies change the colour to a deep greenish yellow, which, on the addition of an acid, disappears, and a brownish flocculent precipitate is produced. It is copiously precipitated by solutions of superacetate of lead white; and by nitrate of silver black. Sulphate of iron strikes with it a pale olive-colour, and a dark precipitate is slowly formed. Hence henbane appears to contain resin, mucus, extractive, an ammoniacal salt, and gallic acid.

Medical properties and uses.—Henbane is narcotic. Its operation is very similar to that of opium, increasing at first the strength of the pulse, and producing some sense of heat; effects which are followed by proportional diminution of excitement, and sleep. In some habits it occasions diaphoresis, or diuresis, and sometimes a pustular eruption; at other times it purges; and in overdoses produces sickness, stupor, dimness of sight, hard pulse, delirium, and coma, with dilatation of the pupils; until the pulse gradually becoming weak and trémulous, petechiæ make their appearance, and death ensues. Dissections show the effects of inflammation both in the stomach and bowels, and the membranes of the brain. After an emetic is given, and the stomach fully cleared, vinegar is the best antidote.

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[1] The seeds abound with oil, and may be eaten with impunity. The roots resemble parsnips, and have occasionally been eaten for them, and fatal effects produced.

[2] In the recent state the odour of the leaves occasions stupor and delirium.

The effects of henbane as an anodyne were known to the ancients[1]: but as those were ill understood, and its use was almost completely relinquished till the time of Baron Stoerck, he may be regarded as having introduced it. It may be employed in all the cases in which the use of opium is indicated, where the latter disagrees with the habit, or where its constipating effect is wished to be avoided. In painful and spasmodic affections, hysteria, rheumatism, and gout, much benefit has resulted from its use; and we have found it particularly serviceable when united with colocynth, or other powerful cathartics, in colica pictonum. It is used externally to lessen and allay the irritation of very sensible parts: hence fomentations of the leaves have been found serviceable in scrophulous and cancerous ulcers, hæmorrhoids, and other painful swellings; and Hufeland recommends the leaves and marsh-mallow flowers boiled in milk, with the addition of a few grains of acetate of lead, as a topical application in scrophulous ophthalmia. Its effects in dilating the pupil, when an infusion of it is dropped into the eye, are similar to those of Belladonna, and hence it is also employed as a preparative to the operation for cataract. It is used, generally, in the forms of extract and tincture only.

Officinal preparations. *Extractum Hyoscyami.* L. E. D. *Tinctura Hyoscyami.* L. E. D.

HYSSOPUS. *Spec. Plant. Willd.* iii. 47.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticillatæ *Linn.* Labiatæ *Juss.*

G. 1096. *Corolla*, lower lip three-parted, with a small intermediate subcrenate segment. *Stamens* straight, distant.

Species 1. H. *officinalis.* Common Hyssop. *Med. Bot. 2d ed.* 318. *t.* 113.

Officinal. HYSSOPI OFFICINALIS HERBA. *Edin.* HYSSOPUS; FOLIA. *Dub.* The herbaceous part and leaves of Hyssop.

Syn. Hyssope (*F.*) Isop (*G.*) Isopo (*I.*) Hysopo (*S.*) Zufāiy yeăbus (*Arab.*)

This is a perennial plant, a native of Siberia and Austria; cultivated in our gardens[2], and flowering from June to Sep-

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[1] Hyosciamus in potu cibove sumptus, qualem ebriorum mentis alienationem infert. *Dioscorid. Alexif.* c. xv. 407.

[2] It was first cultivated in England by Gerarde in 1596. It is not the esof of the Hebrews, nor the *ὕσσωπος* of the Greeks. It has been supposed to be the *zufe* or *cyfe* of the Arabians. *Alston's Mat. Med.* ii. 152.

tember. The root is knobbed, woody, and fibrous: the stalk about two feet in height, obscurely quadrangular, erect, shrubby, and branching. The leaves do not exceed an inch in length, and one third of an inch in breadth, are sessile, of a somewhat glaucous deep green colour, elliptical, entire, punctured, and stand in pairs. The flowers are produced on one side, in long half-verticillated terminal spikes, and intermixed with leaves. The calyx is persistent, nearly tubular, divided at the edge into five acute teeth, striated, and of a purplish colour at first, but afterwards green: the corolla is violet-coloured, with a long whitish tube; the upper lip short, round, and notched at the apex; the lower one separated into three segments, the undermost of which is inversely ovate. The filaments are crowned with simple anthers; the style is slender and bifid; and the seeds are four, at the bottom of the calyx.

Qualities. — The leaves of hyssop have an agreeable aromatic odour, and a bitterish moderately warm taste; qualities that appear to depend on a volatile oil of a yellow colour, which can be obtained separate by distillation with water. It is elevated by alcohol also; but soon exhales, and the spirit loses the odour it had when newly distilled.

Medical properties and uses. — Hyssop is stimulant and tonic. It has been recommended in hysteria; and was formerly employed in catarrhal and other pulmonary affections with the view of promoting expectoration; but the stimulant properties of hyssop render its use doubtful in these diseases; and as a tonic it scarcely merits the least attention.

INULA. *Spec. Plant. Willd.* iii. 2089.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ discoideæ *Linn.* Corymbiferæ *Juss.*

G. 1489. *Receptacle* naked. *Pappus* simple. *Anthers* ending in two bristles at the base.

Species. I. *Helenium.* Elecampane. *Med. Bot. 2d edit.* 64. *t.* 26. *Smith Flora Brit.* 890. *Flora Danica, t.* 728.

Officinal. ENULA CAMPANA; RADIX. *Dub.* Elecampane root.

Syn. Inula Laleniere (*F.*) Alantwurzel (*G.*) Enula Campana (*I.*) Enula Campana (*S.*) Usululrason (*Arab.*)

This species of inula is an indigenous perennial, found occasionally in pastures and rich moist soils[1], flowering in July and August, and ripening its seed in September. The root is thick, branched, externally of a brown or grey colour, and internally white. The stem, which rises about three feet in height, is leafy, round, and furrowed; branched near the top and villous. The leaves are large, ovate, serrated, veined, of a deep green colour on the upper surface, and on the under reticulated, tomentose, and whitish: the radical ones are petiolate, but those of the stem sessile and embracing. The flowers are terminal, solitary, large, and of a golden colour. The calyx is scaly; the exterior scales are large, ovate, imbricated, and externally tomentose; the interior are narrow, linear, equal, and chaffy. The florets of the ray are numerous, spreading, twice the length of the calyx, linear, with the apex tridentate. The anthers end in two bristles at the base. The seeds are quadrangular, smooth, slightly curved, and furnished with a somewhat chaffy pappus. The receptacle is reticulate and papillous.

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[1] Not unfrequent in Essex. *Hudson.* Between Worcester and Ludlow, and Bishop's Castle and Newton. *Smith.* I have seen it near Ewell, Surry.

The roots of elecampane found in the shops, are generally obtained from garden plants. They are fit for use in the second year of their growth; and at this age are preferable to the older roots, which become stringy and woody. They should be dug up in autumn.

Qualities.—Elecampane root when dry has an aromatic, yet slightly fœtid odour; and when chewed, the taste is at first disagreeable, glutinous, and in some degree resembling that of rancid soap; then aromatic, bitter, and hot. Both water and alcohol extract its virtues: the tincture possessing more of the bitterness and pungency of the root than the watery infusion. The decoction, after standing some hours, deposits a white powder resembling starch in appearance; but its properties show it to be a distinct principle; and it has therefore been named *inulin*.[1] In distillation with water this root yields a concrete flaky substance, which seems to hold an intermediate place between camphor and volatile oil in its nature.[2]

Medical properties and uses.—Elecampane is usually ranked as a tonic; and supposed to possess deobstruent, diuretic, and expectorant properties. It was formerly regarded as a remedy of great efficacy in dyspeptic affections, flatulencies, palsy, dropsies, uterine obstructions, and pulmonary complaints: but Cullen observed, that its diuretic powers were trifling; and could not discover that it possessed any expectorant properties.[3] It is scarcely ever used by the regular practitioner. The dose of the powdered root may be from ℈j to ʒj.

IRIS.[4] *Spec. Plant. Willd.* i. 224.

Cl. 3. *Ord.* 1. Triandria Monogynia. *Nat. ord.* Ensatæ *Linn.* Iridæ *Juss.*

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[1] This substance which was first noticed, and its properties investigated, by Rose; was named by Dr. Thomson, *System of Chemistry*, *4th edit.* iv. 697.

[2] *Neuman's Chem. by Lewis*, 2d *edit.* ii. 216

[3] *Mat. Med.* ii. 459.

[4] "Iris a cœlestis arcus similitudine nomen obtinuit." *Dioscorides.*

G. 97. *Corolla* six-parted; the alternate segments reflected. *Stigmas* petal-like.

* *Bearded with ensiform leaves.*

Species 7. I. *florentina*. Florentine Iris. *Med. Bot.* 2*d edit. t.* 262. *Sibthorp Flora Græca.* 28. *t.* 39.

Officinal. IRIDIS FLORENTINÆ RADIX. *Edin.* The root of Florentine Iris.

Syn. Iris de Florence (*F.*) Violenwurzel (*G.*) Ireos (*I.*) Iris (*S.*)

This species of iris, which is found in a wild state in Carniola, the island of Rhodes, Laconia, and other places of the south of Europe, is cultivated in our gardens[1], flowering in May and June. The root is tuberous, horizontal, somewhat jointed, and sends off many fibres from the under part. The leaves spring directly from the root, spreading in opposite directions, are sheathing, sword-shaped, vertical, nerved, curved inwards at the apex, and of a sea-green colour, yellowish at the base. From amidst them the stem rises upwards of a foot in height, erect, simple, naked, round, and commonly bearing two flowers. The flowers are large, of a pale whitish blue colour, erect, terminal, and odorous, bursting from a ventricose, nerved, floral leaf: the petals are alternate, three larger and three smaller: the larger have thickish claws about an inch long, bordered with a thin edge, green on the outside, and bearded within with yellow-tipped white hairs: the border is an inch in width and longer, reflected, whitish, and striated near the flexure: the smaller are whitish blue, stand erect, are bent inwards with a reflected margin; and have thick attenuated greenish claws. The anthers are white, covered by the stigmas, which have the colour of the corolla, and are cleft at the apex into two acute, serrated, upright segments. The capsules are three-celled, containing many seeds horizontally placed.

The roots of the Florentine iris are brought in a dry state from Leghorn, packed in large casks. They are in irregular knobbed pieces, with the cuticle pared off; of a dirty yellowish white colour, and full of small holes, which mark the places whence the radical fibres issued. The best pieces break with a rough, but not fibrous, fracture.

Qualities. — These roots when recent have a bitterish, nauseous taste, and are very acrid; but this acrimony is lost by drying. In their dry state they are brittle, easily pulverized, have a sweetish bitter taste, with a slight degree of pungency, and the agreeable odour of the violet; for which they are chiefly valued. When chemically examined, they appear to consist principally of fecula, with a portion of mucilage and saccharine matter: and to contain malic acid, as their infusion strikes a brown colour with sulphate of iron.

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[1] It was cultivated by Gerarde in 1596.

Medical properties and uses.— The fresh root is cathartic, and has been recommended in dropsies; the dry is nearly inert: but in neither state does it merit a place in the list of materia medica.

JUNIPERUS. *Spec. Plant. Willd.* iv. 851.

Cl. 22. *Ord.* 13. Diœcia Monadelphia. *Nat. ord.* Coniferæ.
G. 1841. Male. *Amentum* ovate. *Calyx* a scale. *Corolla* 0. *Stamens* 3. Female. *Calyx* three-parted. *Petals* 3. *Styles* 3. *Berry* three-sided, irregular, with the 3 tubercles of the calyx.
Species 6. J. *Sabina.* Savine. *Med. Bot. 2d edit.* 10. *t.* 5.
Species 10. J *communis.* Common Juniper. *Med. Bot. 2d ed.* 13. *t.* 6. *Smith Flora Brit.* 1085. *Eng. Bot.* 1130.

1. JUNIPERUS SABINA.[1]

Officinal. SABINÆ FOLIA. *Lond.* JUNIPERI SABINÆ FOLIA. *Edin.* SABINA; FOLIA. *Dub.* Savine leaves.

Syn. Sabinne (*F.*) Sadebaum (*G.*) Sabina (*I.*) Sabina (*S.*)

This shrub is a native of the south of Europe and the Levant; but has been long cultivated in our gardens, flowering in May and June. It seldom rises above three feet in height; is covered with a brown bark, and divided into numerous subdivided branches; which are completely invested with very small, erect, firm, opposite, pointed leaves, of a bright green colour, that lie over each other, and terminate the branches in sharp points; giving the whole shrub a very lively aspect. The *male* and *female* flowers are on different plants. The *male* catkin consists of three opposite flowers placed in a triple row, and a tenth flower at the end: and at the base of each flower is a broad scale fixed laterally to a columnar pedicel. There are filaments in the terminal flower only; tapering and united at the base, with simple anthers, which are sessile in the lateral flowers. In the *female* flowers, the calyx is three permanent scales; the petals are stiff, sharp, and also permanent; and the germen supports three styles with simple stigmas. The fruit is a spurious fleshy berry of a blackish purple colour; marked with tubercles the vestiges of the calyx and petals, and containing three small hard seeds.

Qualities. — The leaves and tops of savine have a strong, heavy, disagreeable odour, and a bitter hot taste, with a considerable degree of acrimony. These qualities depend on an essential oil, which is obtained in considerable quantity by distillation with water. Both water and alcohol extract its active principles; and Lewis found that "on inspissating the spiritous tincture, there remains an extract consisting of two distinct substances, of which one is yellow, unctuous or oily, bitterish, and very pungent; the other black, resinous, tenacious, less pungent, and subastringent."[1]

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[1] Βραθυς Dioscoridis. There are two varieties of Savine; the variety β is our plant.

Medical properties and uses. — Savine is a powerful stimulant, possessing diaphoretic, emmenagogue and anthelmintic properties. It has certainly a considerable effect on the uterine system; but, on account of its stimulating properties, is suited to those cases only of amenorrhœa which are unattended by fever, and in which the circulation is languid. In plethoric habits its use should be preceded by repeated bleedings[2]; and at all times its internal exhibition requires caution. It has been given in gout, and worm cases also, but is seldom used. As an external local stimulant or escharotic, the dried leaves in powder are applied to warts, flabby ulcers, and carious bones; and the expressed juice diluted, or an infusion of the leaves, as a lotion to gangrenous sores, scabies, and tinea capitis; or mixed with lard and wax as an issue ointment. The dose of the powered leaves is from grs. v. to grs. x. two or three times a day.

Officinal preparations. *Oleum volatile Juniperi Sabinæ.* E. D. *Extractum Sabinæ.* D. *Ceratum Sabinæ.* L.

2. JUNIPERUS COMMUNIS.[3]

Officinal. — JUNIPERI BACCÆ ET CACUMINA. *Lond.* JUNIPERI COMMUNIS BACCÆ. *Edin.* JUNIPERUS; BACCÆ. *Dub.* Juniper berries.

Syn. Genevrier ordinaire (*F.*) Wachholde beeren (*G.*) Ginepro (*I.*) Embro (*S.*)

The common juniper is indigenous, growing on heaths and chalky hills, and flowering in May. It is a low, very branching, rigid, smooth, evergreen shrub; but when planted in a good soil it rises to fifteen feet in height. The leaves are very numerous, narrow, entire, sharply pointed, channelled, of a glaucous colour on the upper surface, and sessile, standing in ternaries. The catkins are axillary, sessile, solitary, ovate, small, and furnished with bractes; the male flowers yellow at first, and afterwards brown, with great abundance of pollen; the female smaller, and of a yellowish green colour. The berry is globular, in colour blackish-purple with a glaucous bloom, composed of the scales of the amentum, which become fleshy and coalesce. The seeds are three, and angular.[4]

The berries require to remain two years on the tree before they are fully ripe. The greater quantity of those which are used in Britain are brought from Germany, Holland, and Italy. The Italian berries are less shrivelled, and have a fresher and more beautiful bloom upon them than the German, and are therefore generally preferred. They are imported in bags.

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[1] *Mat. Medica.* [illegible]

[2] Home. *Clinical Experiments*, 387.

[3] ’Αρκευθος μικρα Dioscoridis.

[4] The resinous substance known by the name of Sandarach, which is brought from Morocco, exudes from the stem of the juniper in warm climates.

Qualities. — Juniper berries have a peculiar, aromatic odour, and a sweetish pungent bitterish taste when chewed. In distillation with water they yield a volatile terebinthinate oil of a greenish colour, on which their virtues depend.[1] Both water and alcohol extract their active properties. Their principal constituents are mucus, saccharine matter, and volatile oil.

Medical properties and uses. — Juniper berries are diuretic and cordial. They have been long known as a remedy in hydropic affections; but they cannot be depended on alone, although they form an excellent adjunct to foxglove and squill. The tops are also used; and as the virtues of the berries depend on the essential oil, which is found in the woody part also of the plant, they must be equally efficacious. They have been recommended in scorbutic and cutaneous affections; and Rosenstein asserts that a strong decoction of them soon clears the hands in scabies. The berries are sometimes given in substance, triturated with sugar or some neutral salt; but the best form is that of infusion, made with ℥iij of the berries bruised, and Oj of boiling water. The dose of the first preparation is from ℈j to ʒſs; that of the infusion, a tea-cupful every three or four hours.

Officinal preparations. *Oleum Juniperi.* L. E. D. *Spiritus Juniperi compositus.* L. E. D.

KINO. *Lond. Edin. Dub.* Kino.

Syn. Gomme de Kino (*F.*) Kinoharz (*G.*) Chino (*I.*) Tumble hōan. (*Tam.*)

Although the Edinburgh College has inserted kino as the inspissated juice of the *Eucalyptus resinifera* in the list of materia medica of its pharmacopœia, and the Dublin College has considered it as the product of the *Butea frondosa*; yet we believe that the plant which yields the best kino is an African tree; and from a specimen sent home by Mungo Park in his last journey, which is in the possession of Sir Joseph Bankes, it is a Pterocarpus. It is nevertheless true that kino, such as was brought from Botany Bay about twenty years ago, is the production of the above species of Eucalyptus, the brown gum-tree of that country[2]; but it differs in several of its qualities from the kino described by Dr. Fothergill, who introduced this remedy into practice.[1] We are informed none of it has been brought to this country since the above period. Another sort is said to come from Jamaica, and is stated by Dr. Duncan junior, to be the extract of the *Cocoloba uvifera*, or Sea-side grape[2]; while Mr. Murray says, "he has been informed that it is the extract of the wood of the mahogany."[3] The Dublin College indicated the *Butea frondosa* on the authority of Dr. Roxburgh; but the red juice which this plant yields has been examined by Dr. Duncan, and found to differ very considerably from kino, although it may be used as a substitute for it. The kino now found in the shops comes from India. It is imported in chests containing from one to two cwt. and on the inside of the lid of each chest is a paper, inscribed with the name of John Brown, the month and year of its exportation; and stating that it is the produce of Amboyna.

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[1] The flavour and diuretic properties of Hollands depend on this oil. English gin is flavoured by oil of turpentine.

[2] This plant belongs to the 1st order of the 12th class of the Linnean system. It is a lofty tree, exceeding an English oak in size; and bearing yellowish flowers in umbellated clusters. The calyx is hemispherical, perfectly entire in the margin, and afterwards becomes the capsule; on its top just within the margin stands a pointed calyptra, of the same colour as the calyx, and as long. This calyptra, which is the essential mark of the genus, is analogous to the corolla in other plants, but neither splits nor divides; on removing it a great number of red stamens appear, standing in a conical mass, very resinous, aromatic, and bearing small red anthers. In the centre is a simple style terminated by a blunt stigma, and rising from a transversely cut trilocular germen. The quantity of juice obtained from incisions made into the wood of the trunk amounts sometimes to sixty gallons from one tree. See *White's* Voyage, 231

Qualities. — 1. *Kino* which was given to me as a specimen of true *African Kino*, is inodorous, and insipid when first taken into the mouth; but after some time it imparts a slight degree of roughness, with a scarcely perceptible sweetness, to the palate; feels gritty between the teeth when chewed, and does not colour the saliva. It is in very small, irregularly shaped, shining, deep-ruby-brown-coloured fragments, and intermixed with small twigs and minute bits of wood, which are white in the inside. It is pulverulent, affording a dark chocolate or reddish-brown powder. Water at 60° dissolves the larger moiety of it, and gives a brick red rather turbid infusion, which does not become clear after standing twenty-four hours. Alcohol dissolves nearly two-thirds of it, the tincture having a very deep brown colour: what remains undissolved is nearly colourless. Ether takes up about one-third; and the tincture, which is of a beautiful claret colour, when evaporated on the surface of water-leaves a pellicle of brittle brown resin; while a sweetish red-coloured extractive matter remains dissolved in the water.

2. *Botany Bay kino* is inodorous; tastes bitterish and more austere than the African; is in larger fragments, equally brittle, breaking with a glassy fracture; of a chocolate hue, and affording a brown-coloured powder but it is not uniform in appearance, some of the fragments being of a lighter hue. Water at 60° dissolves nearly the same quantity as of the former variety, and the infusion is brown and transparent. Alcohol dissolves rather more than two-thirds of its weight, but the tincture is not so deep coloured as that of the former variety,

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[1] *Medical Observations and Inquiries by a Society of Physicians in London*, i. 238. 243.

[2] *Edinburgh New Dispensatory*, 5th edit. 292.

[3] *System of Mat. Med. and Pharmacy*, ii. 304.

Ether takes up $\frac{1}{20}$th; a pale brownish straw-colour only is imparted to it; and when evaporated on water, the resinous pellicle is scarcely perceptible, and very little extractive is deposited.

3. The *Kino* said to have been brought from Jamaica, but of which none is now to be procured, is in bitterness and roughness nearly equal to the last variety, but these qualities are accompanied with a slight degree of acidity. It is in brittle fragments of an almost black colour, having a shining, resinous fracture, in which appear small air-bubbles. The powder is of a reddish-brown colour. With alcohol and ether it affords results very similar to those of the first variety. Water dissolves a greater portion of it than of the other two kinds, and forms an infusion intermediate in colour and transparency; approaching in colour to the first, and in clearness to the second variety.

4. *East India* or *Amboyna Kino*, is inodorous, very rough, and slightly bitter when first taken; but it afterwards impresses a degree of sweetness on the palate. It is in small uniform, deep brown, shining, brittle fragments, which appear like portions of a dried extract broken down; being perfectly uniform in their appearance. It is easily pulverized, affording a powder of a lighter brown colour than the fragments. Water dissolves two-thirds of it, forming a deep brown clear solution; whilst the portion that remains undissolved, is long suspended, if mixed with a fresh portion of water. Alcohol dissolves the greater part of this variety, forming a deep claret-coloured tincture, which is not rendered turbid on the addition of water. Ether takes up a portion of it, and forms a yellowish red tincture, which, when evaporated on water, leaves no resinous pellicle.

The following Tables show the result of some experiments with several chemical re-agents on the watery infusions of these three varieties of kino.[1] They point out the distinctive features of the four varieties I have enumerated; but they have no pretensions towards advancing the knowledge of the chemical properties of kino.

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[1] The specimens subjected to these experiments I have reason to think were perfectly genuine. The African kino was brought home twenty years ago.

TABLE I. Precipitates formed in the Aqueous Solution of Kino, by Gelatine and Solutions of some Metallic Salts.

Variety of Kino.	Solution of Isinglass.	Solution of Oxysulphate of iron.	Solution of Nitrate of Silver.	Solution of Oxy-muriate of Mercury.	Solution of superacetate of Lead.
1st.	copious, slowly formed, of a brick red colour.	copious, quickly formed, of a dirty olive black.	copious, slowly formed, of a deep reddish brown.	not very copious, slowly formed, reddish.	copious, flocculent, quickly formed, brown.
2d.	copious, almost instantly formed, of a pink colour.	very slowly formed, of a deep brownish black.	copious, quickly formed, of an olive black.	copious, quickly formed, yellowish pink.	copious, flocculent, quickly formed, lilac.
3d.	scanty, slowly formed, of a pinkish colour.	copious, quickly formed, of a blue black.	copious, quickly formed reddish brown.	scarcely altered.	copious, flocculent, quickly formed, brownish lilac.
4th.	The same as No. 1.	copious, and dirty olive black.	copious, and quickly formed reddish brown.	quickly formed, reddish.	the same as No. 1.

TABLE II. Precipitates formed by Solution of Potash and Acids.

Variety of Kino.	Potash.	Sulphuric Acid.	Nitric Acid.	Muriatic Acid.
1st.	none, but renders it clear and of a deep brown colour.	copious, pale brown.	scanty, slowly formed; reddish yellow.	scanty, slowly formed, yellowish brown.
2d.	flocculent, purplish.	copious, deeper brown.	copious, quickly formed, yellowish brown.	scanty, more quickly formed, pale red brown.
3d.	flocculent, brownish purple.	very copious, very deep brown.	copious, brown.	scanty, quickly formed, a beautiful red.
4th.	the same as No. 1.	copious, pale brown.	copious, quickly formed, brown.	quickly formed, yellowish brown.

From these experiments there appears to be a considerable difference between three of the four varieties of kino known in commerce, but the first and fourth appear to be nearly the same. The most remarkable differences are, the small portion of resin which that from Botany Bay and Amboyna contain; the blue colour of the precipitate of the Jamaica variety by the oxysulphate of iron; and the effect of the solution of potash in rendering that from Africa transparent, while it precipitates the 2d and 3d varieties. The predominant principles in all the varieties are tannin and extractive matter; and the portion of resin in the 1st and 3d varieties enables ether to take up their colouring matter and some extractive, whilst the second variety is scarcely affected by it. Dr. Duncan[1] and Vauquelin[2] observed, that although heat increases the solvent power of water over kino, yet that a substance insoluble either in water or alcohol always remains. Vauquelin also found that the solutions form a precipitate with tartarized antimony and salts of iron.

The best menstruum is diluted alcohol.

Medical properties and uses. — Kino is a powerful astringent. Like catechu it is employed in obstinate chronic diarrhœas, uterine and intestinal hæmorrhagies, and fluor albus; but as it is less certain in its qualities than catechu, it is less used. Externally it has been applied as a styptic, and to give tone to, and diminish the ichorous discharge of, flabby ill-conditioned ulcers.

It may be exhibited internally in substance, or in the form of watery infusion, or of tincture. The dose in substance is from grs. x. to ʒſs. In ordering the infusion or tincture, it is necessary to recollect that solutions of isinglass, sulphate of iron, nitrate of silver, muriate of mercury, superacetate of lead, tartarized antimony, the alkalies, and the strong acids, are incompatible in prescriptions with kino.

Officinal preparations. *Tinctura Kino*. L. E. D.

LACTUCA. *Spec. Plant. Willd.* iii. 1523.

Cl. 19. *Ord.* 1. Syngenesia æqualis. *Nat. ord.* Compositæ semiflosculosæ *Linn.* Cichoraceæ *Juss.*

G. 1404. *Receptacle* naked. *Calyx* imbricate, cylindrical, with a membranous margin. *Pappus* simple, stipitate. *Seed* even.

Species 1. L. *Sativa.* Garden Lettuce. *Blackwell. t.* 8.

[1] LACTUCA SATIVA.

Species 12. L. *virosa.* Strong-scented Lettuce. *Med. Bot.* 2d *edit.* 75. *t.* 31. *Smith Flora Brit.* 819.

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[1] *Nicholson's Journal*, vi. 234.

[2] *Annules de Chimie*, xlvi. 321. Vauquelin states generally that the salts of iron precipitate kino green; but Dr. Duncan justly observes, that by the red sulphate it is precipitated black: the sulphate only precipitates it green.

Officinal. — LACTUCÆ SATIVA HERBA: LACTUCARIUM. The herbaceous part and inspissated juice of the Garden Lettuce.

Syn. Laitue (*F.*) Lattich (*G.*) Lattuca (*I.*) Lechuga (*S.*)

This species of lettuce is cultivated almost generally over Europe. The root is fibrous; and sends up a corymbose stem, which sometimes rises three feet in height. The leaves are roundish, obovate or cordate, shining, crisped, rugose, irregularly plaited, and of a yellowish green colour: but the plant is so well known as to require no description. When it is in flower, the slightest touch of the pedicels occasions the exudation of drops of a white opaque milky looking fluid. The leaves and stem, immediately under the cuticle, contain a secreted juice, which is pellucid and colourless when in the vessels of the plant; but becomes milky when first exposed to the air, and afterwards acquires a brownish colour resembling that of East Indian opium. This is the *Lactucarium*[1] of the Edinburgh College. The best method of procuring it, as first suggested by Mr. John Young, Surgeon in Edinburgh, is to cut off the top of the stem, when it is in flower, about a foot above the ground, and to absorb the milky juice that exudes by means of a moist sponge, from which it can be again compressed into a proper vessel to inspissate. But as the cut surface soon ceases to bleed, another slice must be taken under the first, and this may be repeated as long as the fresh cut surface will yield the juice. The process may be repeated two or three times a day.

Qualities. — Lactucarium has the colour, and in some degree the taste and odour of opium. Distilled water dissolves the greater portion of it; and the clear solution, which is of a deep brown colour, when treated in the same manner as opium, discovers the presence of that principle detected in opium by Serturner, and denominated Morphium; on which its narcotic property depends. It contains besides extractive, resin and mucilage; and Dr. John states that caoutchouc, also, is one of its components.

Medical properties and uses. — Lactucarium has been proposed as a substitute for opium by Dr. Cox of Philadelphia; but its value as a narcotic has been more lately examined by Dr. Duncan, senior, who conceives it to be particularly well adapted for allaying the cough in phthisis pulmonalis: and his opinions have been confirmed by the experience of many other respectable practitioners. It may, undoubtedly prove useful as a soporific[2] where, from peculiar idiosyncracy or other causes, opium cannot be taken. The dose is from ʒi. to ℥vj. in the form of pill: or, of a tincture made with one ounce of lactucarium and a pint of diluted alcohol, from ten to sixty drops may be taken.

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[1] This name was imposed by Dr. Duncan, sen. who first suggested its use as a narcotic. Vide *Obser.* on *Pulmonary Consumptions* by A. Duncan, M. D. *Appen.* p. 169.

[2] I have always found that, when I eat lettuce to supper it acts as a soporific.

Officinal preparations. — *Succus spissatus Lactucæ Sativæ.* E.

2. LACTUCA VIROSA.

Officinal. — LACTUCÆ VEROSÆ HERBA. *Edin.* Strong-scented Lettuce leaves.

Syn. Laitue vireuse (*F.*) Lattuca Salvatica (*I.*)

This is an indigenous biennial plant, found growing on the banks of ditches, and borders of fields, flowering in July and August. The stalk rises about three feet in height, erect, slender, prickly below, smooth above, round, panicled, and not very leafy. The leaves are rather smooth and toothed, the lower ones numerous, obovate, undivided; those of the stem smaller, often lobed, amplexicaule, with the midrib beset with prickles on the under side. The bractes are cordate and pointed. The flowers are numerous, compound, of a sulphur-yellow colour, on short peduncles, furnished with small scaly leaves, and one at the base of each. The calyx is oblong, and composed of small lanceolate scales; and the corolla consists of florets scarcely longer than the calyx. The seeds are elliptical, compressed, striated, black, and furnished with a stipitate scabrous pappus.

The leaves and stem under the cuticle contain a white opaque juice, that abounds more copiously when the plant is in flower; at which time, therefore, they should be gathered, and the juice immediately expressed.

Qualities. — The odour of the leaves is heavy and fœtid, resembling in some degree that of opium; their taste is bitter and acrid: qualities depending on their milky juice. When triturated with water, the solution never clears; and the morphium, which is separated by treating it like opium, cannot be freed from the mucus of the extract.

Medical properties and uses. — The expressed juice is narcotic and diuretic (see *Preparations* and *Compositions*) The leaves themselves are not used.

Officinal preparation. *Succus spissatus Lactucæ virosæ.* E.

LAURUS. *Spec. Plant. Willd.* ii. 477.

Cl. 9. *Ord.* 1. Enneandria Monogynia. *Nat. ord.* Oleraceæ *Linn.* Lauri *Juss.*

G. 798. *Calyx* none. *Corolla* calycine, six-parted. *Nectary* of three two-bristled glands, surrounding the germen. *Filaments* interior, glanduliferous. *Drupe* one-seeded.

Sp. 1. L. *Cinnamomum.* The Cinnamon tree. *Mat. Med. 2d ed.* 670. *t.* 233. *Percival's Account of Ceylon*, 4*to.* 346—350.

Sp. 2. L. *Cassia.* The Cassia tree. Carua, *Rheede Hort. Malabar.* i. *p.* 107. *t.* 59.

Sp. 3. L. *Camphora.* The Camphor Laurel. *Med. Bot. 2d edit.* 681. *t.* 236.

Sp. 10. L. *nobilis.* Common Sweet Bay. *Med. Bot. 2d ed.* 678. *t.* 235.

Sp. 34. L. *Sassafras.* Sassafras Laurel. *Med. Bot. 2d edit. t.* 234.

1. LAURUS CINNAMOMUM.

Officinal.—CINNAMOMI CORTEX. CINNAMOMI OLEUM. *Lond.* LAURI CINNAMOMI CORTEX. *Edin.* CINNAMOMUM; CORTEX, OLEUM ESSENTIALE. *Dub.* Cinnamon, and Oil of Cinnamon.

Syn. Canelle (*F.*) Kanohl (*G.*) Kaneel (*D.*) Canella (*I.*) Canela (*S.*) Dárchini (*H.*) Dárcasita (*San.*)[1]

The cinnamon tree is a native of Ceylon[2], growing in great abundance in many parts of the island, particularly near Columba. It also grows plentifully in Malabar, Cochin China, Sumatra, and the eastern islands. It has been cultivated in the Brazils, the Mauritius, and other places. France is partly supplied from Guiana. It seldom rises above thirty feet in height; has a slender branching trunk covered with a brown ash-coloured cuticle, and from the root spring a number of suckers, which form a bush round the trunk. The leaves, which stand in opposite pairs in short slightly channelled petioles, are from six to nine inches in length, oblong, pointed, trinerved; when young reddish, but afterwards of a bright green colour; and have a spicy odour, and a hot taste when rubbed and chewed. The flowers, which appear in January, are white and inodorous, in axillary and terminal panicles. The petals are oval, pointed, concave, and spreading, longer than the filaments, which are in ternaries, flattish, erect, and the three innermost glanduliferous at the base; and the anthers are double. The fruit is an oval berry, resembling a small acorn, but with the apex depressed, and the pulp fleshy, with a terebinthine odour; and a taste not unlike that of the juniper berry.

There are several varieties of the cinnamon tree known at Ceylon. Seba enumerates ten, but the four following only are said to be barked: 1. Honey, or sharp sweet cinnamon, (*Rase Curundu* in the language of the natives,) which is the finest sort; 2. Snake cinnamon, (*Nai Curundu,*) similar to the first; 3. Camphorated cinnamon, (*Capura Curundu,*) so named from its having the odour of camphor, and the root yielding camphor by distillation; and 4. Bitter astringent cinnamon, (*Cahatte Curundu,*) which has smaller leaves than the former varieties.[1] The trees that grow in the valleys in a white sandy soil are fit to be barked when four or five years old, but those in a wet soil, or in shady places, require to be seven or eight years of age. The bark is good for nothing if the tree be older than eighteen years. The tree was formerly propagated by a species of pigeon, that ate the fruit, and voided the seed; but since Falck, one of the Dutch governors, about the middle of the eighteenth century, raised it from berries sown in his garden, it has been regularly cultivated.

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[1] The Malays call cinnamon kayu-manis, which is sometimes pronounced as if it were written kaina-manis, which Mr. Marshall supposes to have been the original of the ancient Greek name kinnamomon.

[2] Notwithstanding the jealousy of the Dutch, the cinnamon tree, long before the British obtained possession of Ceylon, was cultivated at the Isle of France, in several parts of India, Jamaica, and some other of the West India islands. Mr. Miller first cultivated it in this country in 1768; and a plant of it has regularly flowered and ripened seed in the hot-house of the Bishop of Winchester at Farnham for several years past.

The barking, particularly in the vicinity of Negombo and Matura, commences early in May, and continues until late in October. The *chaliahs*, or people who perform it, are under native officers called cinnamon *moodeliars*[2], who are answerable for the quantity barked. Branches of three years old are selected, and lopped off with a pruning knife, or bill hook called a *ketta*. To remove the bark, a longitudinal incision is made through it on both sides of the shoot, so that it can be gradually loosened, and taken off entire, forming hollow cylinders. The bark in this state tied up into bundles, is allowed to remain for twenty-four hours, by which a fermentation is produced that facilitates the separation of the epidermis, which with the green pulpy matter under it, is carefully scraped off. The bark now soon dries, contracts, and assumes the quilled form, after which the smaller pieces are put within the larger.[3] The cinnamon, when dry, is tied up in bundles of 30 lbs. weight, and carried to the government store-house, where the quality is determined by inspection of the bundles. It was formerly chewed, and the surgeons who used to be thus employed, had their mouths so excoriated, as to be unable to continue the process longer than two days together: but tasting is now seldom had recourse to.

Cinnamon is brought home in bags or bales, weighing 92 lbs. each[4]: and in stowing it black pepper is mixed with the bales to preserve the cinnamon. According to Mr. Marshall's account, the annual quantity of cinnamon sold at the East India Company's sales, taken on an average of the last eight years, up to 1810, is 318,258 lbs.; at an average price of six shillings per pound.[1] But much cinnamon, of an inferior kind, reaches Europe through private merchants, particularly from China.

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[1] The other sorts mentioned by Seba are: Sandy cinnamon, *Welle Coronde*, which feels gritty when chewed; Glutinous cinnamon, *Sewel Coronde*; Insipid and inodorous cinnamon, *Nicke Coronde*; Drum cinnamon, *Dawel Coronde*, so named because the natives make drums of the wood; Prickly cinnamon, *Catte Coronde*; Flowering cinnamon, *Mael Coronde*, the tree being always in bloom; and Three-leaved cinnamon, *Toupat Coronde*. *Phil. Trans.* xxxvi. 97—105.

[2] Under the Moodeliars are inferior officers, named *Mohandrums* and *Aratchays*; and in 1811 General Maitland appointed a superior, who is named *Maha-Moodeliar*.

[3] Prior to the 15th century, all the cinnamon used in Europe was imported by the Arabs, and passed through the hands of the Venetians; after this the Portuguese became the sole importers, and continued to be so until 1645, when their trade was divided with the Dutch, who obtained entire possession of it in 1658; and were the principal cinnamon merchants until 1796, when Ceylon fell into the power of the British.

[4] The bags are made of cloth of the cocoa nut bark.

The *oil of cinnamon* is prepared by macerating the bark in sea-water for two days, then distilling with a slow fire, and separating the oil from the water with which it comes[2] over. It is generally adulterated with alcohol or expressed oil. Eleven pounds of cinnamon are required to procure one ounce of the oil. Cinnamon is sometimes intermixed with cinnamon from which the oil has been drawn, and with cassia. The former is detected by the weakness of its odour and taste; and the latter by its thickness, smooth fracture, and remarkably slimy taste.

Qualities. — Cinnamon has a very pleasant fragrant odour, and a pungent aromatic sweetish taste; but when it is very hot, without sweetness, and leaves a mawkish taste in the mouth, it is of an inferior quality. The best is rather pliable, but breaks in splinters; is as thin as paper, and of a light yellowish colour: thickness and a dark or brown colour, are marks of inferiority. What is called Chinese cinnamon is darker coloured, rougher, denser, and breaks shorter. The taste is harsher, more pungent, and ligneous, without the sweetness of the Ceylon cinnamon. These qualities depend on the *essential oil*, which may be separated by macerating the bark in alcohol, and distilling the tincture; in which process the oil does not rise with the spirit, but remains in the retort. From ℥xvj of the bark Neumann obtained only two scruples and a half of oil.[3] It has a pale gold colour, is heavier than water, perfectly soluble in alcohol, and has the odour and taste of the cinnamon concentrated; But both a heavy and a light oil is obtained from cinnamon, 80 lbs. yielding about five ounces of the former, and two of the latter.

Medical properties and uses. — Cinnamon *bark* is astringent, cordial, and tonic. Hence it is found to be efficacious in alvine fluxes, proceeding from a weakened and languid state of the intestines, dyspepsia, and chronic nervous debility; and, when given in the form of watery infusion, it removes nausea, and checks vomiting. But the principal use of cinnamon is to cover the nauseous taste of other remedies. The *oil* is a powerful stimulant and stomachic; and is used as such in cramps of the stomach, flatulent colic, hiccough, and nervous languors. It is sometimes inserted into the hollow of a decayed tooth to allay the pain of tooth-ach.

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[1] *Annals of Phil.* vol. x. p. 358.

[2] The bark of the roots yields an aromatic essential oil, denominated oil of camphor, which is used in Ceylon as a rubefacient in painful affections of the joints, and in sprains.

[3] *Neumann's Chemistry*, ii. 188.

The dose of the bark in powder is from grs. x to ℈j; that of the oil from ♏j to ♏iij on a lump of sugar.

Officinal preparations. *Aqua Cinnamomi*. L. E. D. *Spiritus Cinnamomi*. L. E. D. *Tinct. Cinnamomi*. L. E. D. *Tinct. Cinnamomi comp*. L. *Pulvis Cinnamomi compositus*. L. E.

2. LAURUS CASSIA.[1]

Officinal. LAURI CASSIÆ CORTEX; FLOS NONDUM EXPLICITUS. *Edin. Dub.* The bark, and flower buds of the Cassia tree.

Syn. of the bark. Casse (*F.*) Casia (*G.*) Cannellina (*I.*) Seleckheh (*Arab.*) Tej (*H.*) Twacha (*San.*)—*of the buds.* Fleur de la Cannelle (*F.*) Cassia Bloemen (*D.*) Tejpatka konpul (*H.*) Sirnāgāpoo (*Tam.*)

The cassia tree is a native of Malabar, Ceylon, Sumatra, and Java; and has been generally supposed to be rather a variety of the cinnamon than a distinct species of *Laurus*; although Marsden's description of the plant[2], and Gærtner's of the fruit[3], afford some reason for thinking that it is properly marked as a distinct species. It rises fifty feet in height, and gives out, almost from the bottom, large spreading horizontal branches: the leaves are from four to six inches long, elliptical, narrow, pointed, entire, smooth, longitudinally nerved, of a deep green colour above, and pale grey beneath: the flowers are in axillary clusters, six together on slender flower-stalks: they are monopetalous, white, small, and divided into six stellated points: the fruit is an ovate, oblong, black berry, with a mucronated apex, standing in a bell-shaped, coriaceous, angled, unequally five or six toothed calyx; it contains a bitterish pulp, and when dry is insipid and inodorous.

Like the cinnamon, those trees which grow in a dry soil and high exposed situation, yield a superior bark to those in a moist soil and shaded spot. The larger branches and the trunk are said to be the parts of the tree barked: and the cuticle only appears to be scraped off, the cellular integument being left, which, as the bark is taken from the larger branches, is thick, spongy, and full of a slimy mucus. This plant is never decorticated at Ceylon. According to Mr. Marshall[4], the *Cassia bud* of commerce is the hexangular fleshy receptacle of the seed of the L. *Cinnamomum*, and not the L. *Cassia*, as supposed by the Dublin College. They are not prepared at Ceylon, but come chiefly from China, through Calcutta, Madras, and Bombay.

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[1] This is this Dawul Kurundu of the Cingalese, the Cannella Matto of the Portuguese, and the wilde Canule of the Dutch. *Marshall, Phil. Trans.* 1817.

[2] *History of Sumatra*, 125.

[3] *De Fructibus*, ii. 69. *t.* 92. If Gærtner be correct, the fruit of the Cassia is depicted, instead of that of the Cinnamon, in the plate of the Cinnamon plant, in Woodville's Medical Botany.

[4] Annals of Phil. vol. x. p. 245.

Cassia is imported in chests, half chests, and occasionally in quarter chests.

Qualities. — The odour of cassia bark is similar to that of cinnamon, but fainter; and the taste is more pungent, but less agreeable; appearing slimy when much chewed. It is of a cinnamon colour, in pieces more or less quilled, about one-tenth of an inch in thickness; which break with a short close fracture, and show it to consist of two parts, the inner darker and of a fine texture, and the outer paler and somewhat spongy. When these are separated, the inner part has all the sensible qualities of real cinnamon, only more pungency, whilst the outer has scarcely either flavour or taste: and I am of opinion that the allowing this cellular integument, from which the cinnamon is freed, to remain in the cassia, constitutes the chief cause of the difference between these two barks.[1] *Cassia buds* have the same odour and taste as the cinnamon bark. They are of a brown colour, and resemble a nail, with a round head, surrounded with the hexangular calyx, which gradually terminates in a point. Both the bark and buds yield in distillation with water an essential oil, similar to that of cinnamon, on which their qualities depend.

Medical properties and uses. — Cassia bark and buds are stimulant cordials; and are used in the same cases, and in the same manner as cinnamon bark.

Officinal preparation. *Aqua Lauri Cassiæ distillata.* E.

3. LAURUS CAMPHORA.

Officinal. CAMPHORA. *Lond. Edin.* CAMPHORA; RESINA.[2] *Dub.* Camphor.

Syn. Camphre (*F.*) Kampfer (*G.*) Canfora (*I.*) Alcanfor (*S.*) Cafoor (*Arab.*) Cafur (*H.*) Curfura (*San.*)

The species of laurel here designated, is a native of Japan. It yields camphor; but I have already stated, that the camphor which comes from Sumatra, that is, the greater part of what is brought to Europe, is the produce of the Dryobalans *Camphora*, a tree belonging to a different genus altogether from the laurel. The camphor laurel[3] rises to a considerable height, is much branched, and covered with a smooth greenish bark. The leaves, which stand on long footstalks, are acutely lanceolate, entire, smooth, ribbed, of a pale yellowish green colour on the upper surface, and on the under glaucous. The flowers are small, white, pedicellated, in roundish close clusters, which terminate long axillary peduncles. The corolla consists of six small ovate, unequal petals, enclosing a tuberculated bristled nectary, which surrounds the germen; the filaments are shorter than the corolla, and support round anthers; the germen is roundish, with a simple style and obtuse stigma. The fruit resembles that of the cinnamon.[1]

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[1] The rejected, or third sort of cinnamon, prepared in Ceylon, has been imported into England and sold as cassia.

[2] This is an error of the Dublin College, chemists being now agreed that camphor is not a resin, but a proximate vegetable principle, sui generis.

[3] Specimens of it are common in our hot-houses; but they rarely flower.

The roots, wood and leaves of this tree have a very strong odour of camphor; and from the roots and smaller branches it is obtained by distillation. They are cut into chips, which are suspended in a net within a kind of still, or iron pot, the bottom of which is covered with water, and an earthen head fitted to it: heat is then applied, and the steam of the boiling water, penetrating the contents of the net, elevates the camphor into the capital, where it concretes on straws with which this part of the apparatus is lined.[2] But as we have already stated, the greater part of the camphor brought to Europe is obtained in Sumatra; where the trees which yield it are cut and split, and the camphor which is found concreted in the heart of them is picked out, and washed in a ley of soap. It is imported into this country in chests, drums, and casks; and is in small granular, friable masses, of a dirty white, or grayish colour, very much resembling in appearance half refined sugar. It often contains earth and other impurities.[3]

Formerly all the crude camphor brought to Europe was purified by the Venetians, and afterwards by the Dutch, who kept the art secret; but it is now practised to a considerable extent in this country. It is sublimed in glass vessels, after being mixed with one twentieth of its weight of quick lime; and afterwards fused either "by increasing the heat suddenly when the sublimation is almost ended, without transferring the camphor to different vessels, or by melting the sublimed flowers in a vessel for that purpose."[4] Thus refined, it is in large round cakes, about two or three inches thick, concave on one side, convex on the other, and generally perforated.

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[1] Camphor is not the production of those plants merely from which that known in commerce is obtained, but has also been procured from the roots of the cinnamon, cassia, and sassafras laurels; from those of galangale, zedoary, ginger; and from cardamom seeds and long pepper. The essential oils of lavender, sage, thyme, peppermint, rosemary, and several other labiated plants, yield it: and an artificial camphor is prepared by passing muriatic acid gas through oil of turpentine. The varieties of camphor thus obtained, however, differ in some respects from common camphor.

[2] According to Kæmpfer, the process is carried on chiefly by the peasants of Satzuma. *Amœn.* 779.

[3] Zea describes a variety of camphor which is procured in South America, from a tree, the botanical characters of which are not yet known; but which is termed *caratte* by the natives. The camphor exudes from the bark in the form of tears.

[4] *Aikin's Dictionary of Chemistry*, art. *Camphor*. Professor Robison, who saw the process as it was conducted in Holland, says, that the camphor is in a liquid state in the subliming vessel. *Black's Lectures*, ii. 351.

Qualities. — Pure camphor has a strong, peculiar, fragrant, penetrating odour; and a bitter, pungent, aromatic taste. It is white, transparent, unctuous to the touch, and friable, breaking with a shining foliated or tabular fracture, which displays a crystalline texture: and although brittle, yet it is also in some degree ductile, and therefore not easily pulverised. It swims on water, its specific gravity being 0·9887[1]: and is so volatile, that if it be not kept in well stopt vessels, it loses a very considerable proportion of its bulk and weight by evaporation. It melts at a temperature of 260°, and sublimes in close vessels, crystallizing unchanged in hexagonal plates. It is readily ignited, and burns with a brilliant flame, giving out much smoke. When triturated with water, very little is dissolved[2], although it communicates to the water its odour and pungency; but the addition of carbonic acid gas augments very much the solvent power of water over camphor. Alcohol, ether, the fixed and volatile oils, the sulphuric and nitric acids a little diluted, and the muriatic, the strong acetic, and the fluoric acids, dissolve camphor, which is again separated unaltered from these solutions by the addition of water. Concentrated sulphuric acid decomposes it, forming artificial tannin; and by repeatedly distilling it with nitric acid, it is converted into camphoric acid. Alkalies exert scarcely any action on camphor: but it unites with, and converts into a soft tenacious mass, the hardest resinous substances. Camphor, when mixed with clay, and distilled in close vessels, is decomposed, and resolved into a volatile oil and charcoal: hence, as a chemical compound, it appears to differ from the essential oils, only in containing a larger proportion of carbon.

Medical properties and uses. — Camphor is stimulant, narcotic, and diaphoretic, but its stimulant powers are very transitory, and followed by sedative effects. The Arabians appear to have first used camphor as a medicine[3], and by them it was regarded as refrigerant; an opinion which, even in more recent times, has been the subject of much controversy. In moderate doses it operates as a cordial, increasing the heat of the body, exhilarating, softening, and rendering fuller the pulse, and promoting diaphoresis: in larger doses it allays irritation, and spasm, abates pain, and induces sleep. But in immoderate doses camphor produces vomiting, vertigo, delirium, convulsions, and other deleterious effects.

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[1] Brisson.

[2] Cadet asserts that one French pint of water dissolves about sixteen grains of camphor, which are again precipitated by pure potass. *Ann. de Chimie.* lxii. 132.

[3] They called it *Canfur* as well as *Cafoor*. *Clusius Exot.* 246, quoted by *Alston*.

As a stimulant, camphor is beneficially used in all fevers of the typhoid kind, cynanche maligna, malignant measles, confluent small-pox, and as an adjunct to bark and opium to check the progress of gangrene; and in spasmodic affections, as hysteria, epilepsy, chorea, asthma, and painful menstruation. Its narcotic and anodyne effects being produced with very little increase of pulse, it has been successfully employed for allaying pain and irritation even in some inflammatory diseases, as pneumonia, acute rheumatism, gonorrhœa, small-pox, when attended with convulsions, gout, and in the delirium of mania, and inflammatory fevers. But in these cases its use should be preceded by evacuations; and the remedy itself combined with nitre, or antimonials. Camphor is also given internally to obviate the irritating effects of some other medicines, as mezereon, cantharides, the saline preparations of mercury, and drastic purgatives; to correct the nauseating property of squill, and prevent the irritation it is apt to produce on the coats of the bladder.

Camphor may be administered in the solid form; but as in this state it is apt to occasion nausea, it is generally ordered in a state of minute division, suspended in fluids by means of mucilage or the yolk of eggs; sometimes by magnesia, which, assisting its division, and rendering it smooth as starch, admits of its combination with acids; and as several of the gum resins, when triturated with it, form a soft, uniform, soluble mass, they also may be employed for diffusing it in water.[1] It may be advantageously united with ammonia, aromatics, opium, bark, and other tonics, in low fevers and diseases of debility; with calomel, antimonials, digitalis, and neutral salts, in inflammatory diseases; with the fetid gums and other narcotics, in spasms and convulsive affections; and with squill and ipecacuanha, in pulmonary complaints.

As a local anodyne, camphor is used in frictions, dissolved in oils, alcohol, or acetic acid, for allaying rheumatic and muscular pains; and with the addition of laudanum we have found it of great efficacy when rubbed on the abdomen, in flatulent colic, dysentery, and inflammations of the viscera. In collyria it is useful in ophthalmia; and dissolved in oil, as an injection in ardor urinæ; and as an enema in the tenesmus occasioned by ascarides, or other irritations of the rectum. A pill of camphor and opium put into the hollow of a carious tooth, affords almost immediate relief in tooth-ach.

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[1] *Murray's System of Mat. Med. and Pharm.* ii. 157.

[2] In some constitutions it must be exhibited in this form with caution; "two scruples of it given to a woman in a glyster, proved so irritating as to bring on pains resembling those of labour." *Heberden. Med. Trans.* vol. i. p. 473.

The dose of camphor is from grs. ij to ℈ j, repeated at shorter or longer intervals according to the extent of the dose. The bad effects of an overdose are most effectually obviated by opium.

Officinal preparations. *Mistura Camphoræ.* L. D. *Emulsio camphorata.* E. *Spiritus Camphoræ.* L. E. D. *Tinctura Camphoræ composita.* L. E. D. *Acidum acetosum camphoratum.* E. D. *Linimentum Camphoræ.* L. E. D. *Linimentum Camphoræ comp.* L.

4. LAURUS NOBILIS.[1]

Officinal. LAURI BACCÆ ET FOLIA. *Lond.* LAURI NOBILIS FOLIA; BACCÆ; OLEUM FIXUM. *Edin.* Laurel berries and leaves, and the fixed oil of the berries.

Syn. Baies de Laurier (*F.*) Lorbeeren (*G.*) Bacchi di Lauro Riccio (*I.*) Bayas (*S.*)

This tree is a native of Italy and the south of Europe; but is cultivated in this country, and is not uncommon in our gardens, flowering in April and May. It is a handsome evergreen; and although it appears as a shrub in England, yet in its native soil and climate it rises twenty or thirty feet in height. The bark is smooth, and of a green olive colour. The leaves are lanceolate, about three inches long, and an inch and a half broad, on short petioles, smooth, entire, veined, often waved at the margin, of a firm texture, and a deep green colour. The flowers are male and female on different plants, in short racemes, and of an herbaceous or yellowish white colour. The corolla is divided in both descriptions of flowers into four oval segments. The berry is superior, of an oval shape, fleshy, and of a dark purple almost black colour.

Laurel berries, and the oil which is obtained by boiling the berries in water, are imported from the Streights. The simple expressed oil is insipid.

Qualities.—Both the *leaves* and *berries* have a sweet fragrant odour, and an aromatic, astringent taste; and the *oil*, which is of a yellowish green colour, has a stronger but similar odour and taste. Water distilled from the leaves shews traces of Prussic acid.

Medical properties and uses.—Bay leaves, berries, and oil; are stimulant and carminative. They were formerly given in flatulent colic, hysteria, and obstructed menstruation, but their internal use is now abandoned; and, as an external application, they are generally compounded with other stimulants.

5. LAURUS SASSAFRAS.

Officinal. SASSAFRAS; LIGNUM ET RADIX. *Lond.* LAURI SASSAFRAS LIGNUM, RADIX. *Edin.* SASSAFRAS; LIGNUM, CORTEX, RADIX. *Dub.* The wood, root, and bark of Sassafras.

Syn. Sassafras (*F.*) Sassafras (*G.*) Sassofrasso (*I.*)

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[1] Δαφνη Dioscoridis.

This species of laurel is a native of North America and Cochinchina. It is cultivated in Jamaica; and withstands the cold of our climate so as to be frequently reared in gardens as an ornamental shrub. The flowers appear in May and June. In America the plant rises twenty or thirty feet in height, with the trunk about twelve inches in diameter, covered with a rough, furrowed, gray bark, and brownish towards the top. The leaves are of different shapes and sizes; some being oval, entire, and about four inches long and three broad; others lobed, about six inches long, and nearly as broad: they are of a lucid green colour, downy on the under surface, petiolate, and alternate. The flowers which appear in spring immediately under the leaves when they begin to be evolved, are small and produced in pendant panicles; and at the base of the pedicels are linear bractes. The corolla is divided into six narrow, convex, yellowish, or greenish white segments, inclosing, in the male flowers, nine stamens supporting yellow anthers. The hermaphrodite flowers, which are on a separate plant, have six stamens only, and a simple style. The berry is oval, and when ripe of a blue colour.

The sassafras laurel was discovered by the Spaniards, immediately after their conquest of Florida, in 1538, under Ferdinand de Soto, and termed by them cinnamon wood, on account of its odour.[1] It is imported in what are termed logs; which are straight and branched pieces, light, of a spongy texture, and covered with the thick rough bark. The bark is separated, and the wood then cut into chips, as is also the root.

Qualities. — Sassafras wood, root, and bark have a fragrant odour, and a sweetish aromatic taste. The wood is of a brownish-white colour; and the bark ferruginous within, spongy, and divisible into layers. Their sensible qualities and virtues depend on an essential oil, which can be obtained separate by distilling the chips or the bark with water. It is very fragrant, hot and penetrating to the taste, of a pale yellow colour, and heavier than water. Water extracts the virtues of sassafras partially; alcohol completely; and when the tincture is evaporated it leaves an extract which contains the whole virtue of the plant.

Medical properties and uses. — Sassafras is a stimulating diaphoretic and diuretic. It has been employed in cases of scurvy, chronic rheumatism, gout; and in cutaneous affections: and was once regarded as serviceable in lues venerea, but it has no pretension whatever to the character of an antisyphilitic. Its effects are very uncertain: and even the diaphoresis which it is supposed to occasion, may rather be ascribed to the guaiac, and other more powerful medicines, with which it is generally combined. An infusion of the chips taken as tea, is a common domestic remedy in the above complaints; but I know instances in which it has been taken regularly every morning for a couple of years without any perceptible benefit. The infusion, however, is the best form of giving the remedy, as much of the oil is dissipated in making the decoction. The oil is sometimes given with the same intentions as the infusion.

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[1] *Savary's Dictionary*, ii. l. 487.

Officinal preparations. *Oleum Sassafras.* L. E. D. *Decoctum Sarsparillæ compositum.* L. D.

LAVANDULA. *Spec. Plant. Willd.* iii. 60.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticillatæ.
G. 1099. *Calyx* ovate, somewhat toothed, supported by a bract. *Corolla* resupine. *Stamens* within the tube.
Species 1. L. *Spica.* Lavender. *Med. Bot. 2d ed.* 221. *t.* 114.
Officinal. LAVANDULÆ FLORES. *Lond. Dub.* LAVANDULÆ SPICÆ FLORES. *Edin.* The flowers of Lavender.

Syn. Lavande (*F.*) Lavendelblumen (*G.*) Lavanda (*I.*) Alhuzema (*S.*)

This plant is a perennial, a native of the south of Europe, but commonly cultivated in our gardens[1], flowering from June to September. It is a much branched shrub, rising in its proper soil often six feet in height; the woody part of the stem being covered with a rough brown bark, while that of the shoots, which are four cornered, is of a pale glaucous colour. The leaves of the most common variety are glaucous, narrow, nearly linear, and entire, the lower petiolate, and the upper ones sessile. The flowers are produced on the young shoots, in terminal spikes, which consist of interrupted whorls. The corolla is blue, tubular, and labiate, the upper lip larger and bifid, the lower divided into three segments. The filaments are within the tube, and support small simple anthers; the style, which is slender, and crowned with a bilobated stigma, rises from the centre of four naked seeds at the bottom of the tube.

There are two other varieties[2] of this species; but they are more rare, and do not differ in their sensible and medicinal qualities. The flowers are cut in dry weather, when they begin to blow.

Qualities.—Lavender flowers have an agreeable fragrant odour, and warm bitterish taste. Alcohol extracts their virtues completely, and elevates in distillation all their odorous parts; water acts less completely. The oil, however, on which their virtues depend, is obtained separate in distillation with water; in the proportion, according to Lewis[3], of one ounce of oil from sixty ounces of the flowers.

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[1] It was cultivated in England so early as 1568, according to Turner.

[2] β L. *angustifolia flore albo.* γ L. *latifolia.*

[3] *Mat. Med.* 371.

Medical properties and uses. — Lavender is stimulant, and tonic. The oil extracted by alcohol enters into several compositions. The dried leaves in powder were used formerly as a sternutatory; but they are now neglected.

Officinal preparations. *Oleum Lavandulæ.* L. E. D. *Spiritus Lavandulæ.* L. E. D. *Spiritus Lavandulæ compositus.* L. E. D.

LEONTODON. *Spec. Plant. Willd.* iii. 1544.

Cl. 19. *Ord.* 1. Syngenesia Æqualis. *Nat. ord.* Compositæ Semiflosculosi *Linn.* Cichoraceæ *Juss.*

G. 1407. *Receptacle* naked. *Calyx* double. *Pappus* stipitate, hairy.

Species 1. L. *Taraxacum.*[1] Dandelion. *Med. Bot. 2d ed.* 39. *t.* 16. *Smith Flor. Brit.* 822. *Eng. Bot.* 510.

Officinal. TARAXACI RADIX. *Lond.* LEONTODI TARAXACI HERBA, RADIX. *Edin.* TARAXACUM; (DENS LEONIS) RADIX, FOLIA. *Dub.* The root and leaves of common Dandelion.

Syn. Dent de Lion; Pissenlit (*F.*) Lowenzahn wurzel (*G.*) Tarassaco (*I.*) Cardillos tagarnina (*S.*)

This is one of our most common indigenous plants, flowering from April to September. The root is fusiform, and externally of a dark colour. The leaves are all radical, in general runcinate, but in very moist situations nearly entire[2], toothed, smooth, and of a pleasant green colour. The flower-stem is an erect, one-flowered simple scape, naked, smooth, fistulous, fragile, and abounding with a milky bitter juice. The flower is terminal, large, of a golden colour, and closes in the evening: the calyx is smooth, with the exterior scales loosely turned down: the florets are very numerous, ligulate, and toothed at the extremities. The receptacle is spheroid, and punctured. The seeds are obovate, furrowed, of a pale olive colour; and furnished with a radiated pappus, on a large stipe.

The herbaceous part of this plant is blanched, and used on the continent as a salad; but in this country, although it is designated by the Edinburgh and Dublin Colleges, yet it is very seldom used, the root possessing much more of the principle on which the medicinal powers of the plant depend. The recent full-grown root only should be used. It is white, and covered with a brown cuticle.

Qualities. — Dandelion is inodorous, but has a bitter, somewhat sweetish acidulous taste. The milky juice reddens the vegetable blues, owing, according to Hermbstadt[3], to the presence of tartaric acid. Water extracts its virtues better than alcohol; and scarcely any thing is taken up by ether: yet Dr. John detected caoutchouc in it. The decoction is precipitated by infusion of galls, and solutions of nitrate of silver, muriate of mercury, and superacetate of lead. Sulphate of iron strikes with it a pale olive colour, and after some time throws down a precipitate. Hence it is probable that the active principles of taraxacum are extractive, gluten, a bitter principle which does not appear to be resinous, and tartaric acid either free or as a supertartrate. The above re-agents are incompatible with the decoction.

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[1] Αφακη Græcorum.

[2] It must be distinguished from *Leontodon palustre*, Marsh Dandelion.

[3] *Thomson's Chemistry*, 4th ed. v. 641.

Medical properties and uses.—Dandelion is aperient, and diuretic. It has been long used on the continent as a remedy in jaundice, dropsy, pulmonic tubercles, hepatic obstructions, and some cutaneous diseases.[1] In this country it has been lately tried: and although its powers appear to have been overrated by the German physicians, yet it certainly possesses some efficacy in these diseases: and Dr. Pemberton affirms, that he has seen great advantage result from using the extract in chronic inflammation and incipient scirrhus of the liver, and in chronic derangements of the stomach.[2] It may be given in the form of extract, or of infusion, made by boiling ʒij of the sliced root in Oij of water, down to a pint, and to the strained fluid adding ʒiij of supertartate of potass: fʒij may be given for a dose three or four times a day.

Officinal preparation. *Extractum Taraxaci*, L. D.

LICHEN.

Cl. 24. *Ord.* 5. Cryptogamia Algæ. *Nat. ord.* Algæ.

Generic Char. Male. Scattered warts.

Female. Smooth shields or tubercles, in which the seeds are embedded.

Species 1. L. *Islandicus.* Iceland or Eryngo-leaved Liverwort. *Engl. Bot.* 1330. *Flor. Danica*, 155. *Regnault, Observations on Pulmonary Consumption.* fig.

Species 2. L. *Roccella.* Dyer's Lichen, or Orchall. *Engl. Bot.* 211.

1. Lichen islandicus.

Officinal. Lichen. *Lond.* Lichen islandicus. *Edin. Dub.* Iceland Liverwort.

Syn. Lichen d' Islande (*F.*) Isländisches Moos (*G.*) Lichene Islandico (*I.*)

This species of lichen is an indigenous perennial. It is very abundantly found in Iceland, and in the north of Germany; and is more or less common on all the heaths and mountains of the north of Europe.[3] It grows to the height of two or three inches only, and has a rugged bushy aspect. The frond is dry, coriaceous, lobed and laciniated, the lobes being subdivided and notched, resembling in appearance a buck's horn; but concave above and convex beneath; their surface is smooth, shining, and blistered; the margins beset with short, very minute, rigid, parallel hairs: and the colour of the whole is greenish yellow, or grayish brown.

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[1] *Bergius, Mat. Med.* ii. 649.

[2] *Diseases of the Abdominal Viscera*, 42.

[3] It grows abundantly in the Asturias. *Journ. de Physique*, 1806.

This plant is used in Iceland and Lapland as an article of diet; being boiled in broth or milk after being freed from its bitter by repeated maceration in water, or dried and made into bread. It has of late years been brought in considerable quantity to this country for medicinal purposes.

Qualities. — The dried lichen differs very little in its appearance from the recent plant. It is inodorous, and has a bitter mucilaginous taste; is neither very tough nor very brittle, but is not easily pulverized. When macerated in water it absorbs more than its own weight of the fluid, and the blisters appear like little white opake glands, while the other parts of the plant are diaphanous. If the water employed in the maceration be warm, it acquires a strong bitter taste, very similar to that of an infusion of quassia. The macerated lichen boiled in water affords a yellow-coloured inodorous decoction, which thickens as it cools, and becomes a tremulous jelly, resembling starch, but without any viscidity. After some time this jelly cracks, separates from the watery part, and dries into semi-transparent masses which are not soluble in cold water, but soluble in boiling water; and from which it is again precipitated by infusion of galls. According to the analysis of Proust, 100 parts of lichen afford 64 parts of a substance insoluble in hot water, somewhat resembling vegetable gluten, 33 parts of a matter soluble in hot water, resembling starch, and three parts of a bitter extractive principle.[1]

Medical properties and uses. — Iceland liverwort is tonic, and demulcent. From some remarks of Linnæus, made in 1737 in the Flora Lapponica, it would appear that the Danish physicians had long before that time employed this lichen, and found it efficacious in hæmoptysis, and pulmonary complaints; but it did not excite the attention of even the continental physicians, till after Scopoli's observations on it, in 1769, were published; and very few years have passed since it was known as a remedy in this country. Its virtues for the cure of phthisis have been very highly extolled; but experience has not altogether confirmed the truth of the praises which have been lavished on it.[2] Its supposed specific effects are said to depend on the combination of its tonic bitter and its demulcent properties. As a demulcent it is certainly superior to the mucilages; and owing to the bitter principle it contains, its decoction affords all the good effects that can be obtained from the other demulcents, and the mucilages, without loading the stomach. It allays the tickling cough, and relieves the oppressed breathing; involves the acrid matters contained in the stomach and bowels which often induce diarrhœa, and renders more bland the whole mass of animal fluids, so as to mitigate hectic fever, while at the same time it tends to invigorate the digestive organs. Still, however, its efficacy in phthisis is very circumscribed; but the circumstances above enumerated ought not to be overlooked, nor the Iceland lichen regarded, as it often is, as a demulcent not more worthy of notice than the other articles of the same class. Besides phthisis, it has been also found useful in debilities after acute diseases, and in emaciations, particularly those arising from the great discharge of ulcers; in diarrhœas, dysentery, and hooping-cough.

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[1] *Journal de Physique*, 1806.

[2] It still possesses a high reputation as a remedy for phthisis, by the natives of Iceland. *Mackenzie's Travels*, 4to. *Appendix*, p. 411.

It is generally exhibited in the form of decoction; (See *Preparations* and *Compositions*;) but as the bitter proves hurtful where the lungs or other viscera are actively inflamed, that part must be therefore separated. This is effected by cutting or pounding the lichen, macerating it in several waters, and then, after boiling it for ten minutes, and decanting off the water, boiling it to the form of a mucilage in a fresh portion of water.

Officinal preparation. *DecoctumLichenis.* L. D.

2. LICHEN ORCELLA.[1]

Officinal. LITMUS; LACMUS TINCTORIUS. *Dub.* Litmus.

Syn. Orchel, Orseille (*F.*) Oricello (*I.*) Orciglia (*S.*)

This is an indigenous lichen, found in Portland island; but as an article of commerce it is obtained from the Levant; and also the Canary islands[2] which produce annually, 2600 quintals. It is a small species, seldom exceeding two inches in height, and is firmly fixed to the rocks by a solid base. From this base rises a tuft of worm-like stems, round, acutely pointed, often curved, more or less branched, smooth, of a white, gray, or brownish hue, and studded about their upper part with scattered tubercles, replete with white powder, which have been thought the seeds; but the fructification of this species is not well understood.

From this lichen is prepared the *argol* or *archil* of commerce. It was known to the ancients, being the Λειχην of Dioscorides and the *Phycos thalassion* of Pliny. Its use as a dye, was, however lost; till it was again accidentally discovered by a merchant of Florence, in 1300[3], observing that urine gave the lichen a fine violet colour. The preparation was long a secret, and was confined to Florence and Holland; but it is now known in England, and large manufactories of it are carried on in London and Liverpool. The lichen, after being dried and cleaned is reduced to powder in a mill resembling an oil-mill.[1] It is then mixed in a vat with one half of its weight of pearl ash, and moistened with human urine: fermentation soon succeeds, and is kept up by stirring, and by successive additions of urine, until the colour of the materials changes first to red and then to blue. In this state it is mixed with a third of its weight of good potash, and spread out to dry.[2] Chalk is sometimes added to it, but with no other view than to increase the weight.[3] It is generally sold in the form of cakes, but sometimes in that of a moist pulp.

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[1] Vide *Dillenius' Hist. Muscorum*, 4to. p. 120. tab. 17. fig. 39. where it is figured under the name of Coralloides corniculatum fasciculare tinctorium, fusci teretis facie.

[2] The ancients named the Canaries the purple Isles, from the abundance of orchilla which they yielded. *Mem. de l' Acad. des Inscriptions*, tom. iv. p. 457.

[3] *Thomson's Chemistry*, 4th ed. v. p. 284. *Bancroft on Philosophy of Colours*, 2d ed. vol. p. 292.

Qualities. — Prepared argol has a slight violet odour, and a mawkish taste, leaving some degree of pungency in the mouth. When moist, the form of the lichen is evident in the pulp. It communicates to water and to alcohol a beautiful violet colour, which however is very evanescent: all acids and salts with an excess of acid change it to red, which is again destroyed and the blue restored by the addition of alkalies; and even exposure to the air of a room in which many people are assembled, reddens the watery infusion. The tincture is least liable to change when kept, if it be reddened by an acid and kept in close vessels.

Use. — This species of lichen is said to have been "administered medicinally with an intention of allaying the tickling attendant on phthisis, and in hysterical coughs[4];" but we must suppose the recent lichen is meant, or before it has undergone any preparation as a colouring matter. We know of no other use of the prepared lichen than as a dye stuff, or a chemical test of the presence of acids; and it is certainly the most delicate.

LINUM.[5] *Spec. Plant. Willd.* i. 1533.

Cl. 5. *Ord.* 5. Pentandria Pentagynia. *Nat. ord.* Gruinales *Linn.* Caryophylleæ *Juss.*

G. 590. *Calyx* five-leaved. *Petals* five. *Capsule* five-valved, ten-celled. *Seed* solitary.

* *with alternate leaves.*

Species 1. L. *usitatissimum.* Common Flax. *Med. Bot.* 2d *ed.* 566. *t.* 202. *Smith Flora Brit.* 342. *Curtis Lond. fasc.* 5. *t.* 22.

** *with opposite leaves.*

Species 26. L. *catharticum.* Purging Flax. *Smith Flora Brit.* 344. *Eng. Bot.* 382.

1. LINUM USITATISSIMUM.

Officinal. LINI USITATISSIMI SEMINA. *Lond. Edin.* LINUM; SEMINA. *Dub.* Linseed, and Linseed oil.

Syn. Grains de Lin. (*F.*) Leinsaamen; Flachsaamen (*G.*) Semi di Lino (*I.*) Laxor (*S.*) Busrue (*Arab.*) Tisi (*H.*) Atasci (*San.*)

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[1] Sometimes it is not ground, but prepared in the entire state.

[2] *Nicholson's Journ.* 4to. ii. 311.

[3] Archil is chiefly used by the dyers, and in times of scarcity the lichen has been sold at 1000*l.* sterling the ton. It is often mixed with the lichen fuciformis.

[4] *Translation of the Dublin Pharmacop.* p. 165.

[5] Λινον Dioscoridis.

The common flax is an annual plant, flowering in July. It is supposed to have been originally brought from those parts of Egypt which are annually inundated by the rising of the Nile; but it is now found growing wild in this country; and is cultivated in most parts of Europe. The root is simple and fibrous. The stem is erect, round, smooth, slender and leafy; branched with a panicle at the summit, and rising about two feet in height. The leaves are small, lanceolate, entire, obscurely three-nerved, smooth, sessile, standing nearly upright, and alternate on both the stem and branches. The flowers are petiolate; the calyx persistent, composed of five sharp-pointed, keeled, trinerved, ovate leaflets; and the corolla consists of five notched, oblong, sky-blue, streaked petals, which spread into funnel-formed blossoms. The filaments are white, dilated, and slightly united at the base; the germen is ovate, and crowned with five blue, thread-like, spreading, reflected stigmas. The capsule is globular, the size of a common pea, crowned with a sharp spine, formed by the junction of the spines of the valves in one point: and containing in each cell an elliptical shining seed.[1]

Although this plant is extensively cultivated in Britain, yet the greater part of the linseed used here is brought from the Baltic. The seed ripens in September; and the plant is then pulled up as soon as the heads begin to change brown and hang downwards, otherwise the seeds are soon scattered.

Qualities. — These seeds are inodorous, and have an oily, mucilaginous, sweetish taste. They are small, flat, oval, and covered with a smooth, shining, brown-coloured cuticle, which abounds with a mucus, that can be extracted pure by infusion in boiling water. By expression they yield one-sixth of their weight of fixed oil. The mucus of linseed is colourless, insipid, inodorous, and resembles in its viscidity mucilage of acacia gum; but differs from it in the following particulars: Alcohol precipitates it in white flocks, but the liquid remains clear; superacetate of lead throws down a dense precipitate; but oxy-sulphate of iron and silicated potash produce no sensible effect. For the qualities of the oil, see *Preparations.*

Medical properties and uses. — Linseed is emollient and demulcent. The mucus obtained by infusion is a cheap and very useful demulcent in catarrh, pneumonia, diarrhœa, and dysentery: visceral inflammations, calculus, gonorrhœa, ardor urinæ; and during the exhibition of oxymuriate of mercury. When the seeds are boiled in water, the mucus is obtained in union with a portion of the oil; forming a useful local remedy when given in the form of enema in abrasions of the intestines and tenesmus, particularly in the advanced stage of puerperal fever, when the offending matter in the bowels stimulates to frequent and involuntary stools: but the portion thrown up must be small in quantity.[1] The seeds ground into powder or meal, and simply mixed with boiling water, form an excellent poultice; valuable on account of the facility with which it is made.

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[1] The partitions of the cells are singular. Gærtner thus describes them: "Dissepimenta membranacea, conduplicata, laminis suis extrorsum partitis, ita valvularum marginibus inserta, ut, cum hæ dehiscunt, illæ corii follis adinstar explicentur:" and adds, "Dissepimentorum in Radiola atque Lino fabrica, hactenus sine pari est, et essentialem hujus generis præbet characterem." *De Fructibus,* ii. 147.

Officinal preparations. *Infusum Lini.* L. *Oleum Lini.* L. E. D.

2. LINUM CATHARTICUM.

Officinal. LINUM CATHARTICUM. *Lond.* LINUM CATHARTICUM; HERBA. *Dub.* Purging Flax.

Syn. Lin Purgatif (*F.*) Purgier factis (*G.*)

This in an indigenous annual plant, found on dry and hilly pastures, flowering from June to August. The root is small, and sends up several delicate, leafy, erect, smooth stems, simple at the base, but above dichotomous and many flowered, and from three to nine inches high. The leaves are opposite, of a subelliptical lanceolate shape, obtuse, entire, green on the upper surface, and glaucous beneath. The flowers are small, and white; nodding before they open, and then erect. The leaves of the calyx are pointed, serrated, and one-nerved; the petals obovate, acute, white, and spreading; the filaments are united, forming a circle round the lower part of the germen, which is furnished with capitate stigmas. The seeds are yellow and shining.

Qualities. — Purging flax, whether in the recent state or dried, is nearly inodorous, and has a bitter subacrid taste. Water extracts the virtues of the plant, which communicates to it, besides its sensible qualities, a yellow colour. Macerated in ether it affords a green tincture, which deposits when it is evaporated on the surface of water a green bitter resin, and an extractive matter, on which the virtues of the plant seem to depend.

Medical properties and uses. — This species of flax was celebrated as a purgative by Gerarde. It may be given in the form of infusion, made with ʒij of the dried plant, and f℥ij of boiling water; or ʒj of the dried plant in powder may be taken for a dose. But it possesses no particular advantages, and appears only to swell unnecessarily the list of purgatives.

LYTHRUM. *Spec. Plant. Willd.* ii. 865.

Cl. 11. *Ord.* 1. Dodecandria Monogynia. *Nat. ord.* Calycanthemæ *Linn.* Salicariæ *Juss.*

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[1] *Denman's Midwifery,* ii. 251.

G. 951. *Calyx* twelve-toothed. *Petals* six, inserted into the calyx. *Capsule* two-celled, with many seeds.

Spec. 1. L. *Salicaria.*[1] Loosestrife, or Purple Willow Herb. *Med. Bot. 2d edit. Smith Flora Brit.* 510. *Engl. Bot.* 1061.

Officinal. LYTHRUM SALICARIA; HERBA. *Dub.* Loosestrife.

This is an indigenous perennial plant, found wild in almost every part of Europe, in marshes and on the banks of rivers, flowering from July till September. It is an elegant plant. The root is woody, branched, and extended; sending up an erect, leafy, slender, reddish, downy stem, about three feet in height, quadrangular, and sometimes hexagonous. The leaves are opposite, sessile, lanceolate, and cordate at the base; smooth on the upper surface, but pubescent beneath, and at the margin. The flowers are in the axillæ of the leaves, forming a leafy spike of a verticillated aspect: the calyx is red, hairy, and the segments of different shapes, six being awl-shaped and erect, and six small, ovate, concave, and bent inwards; the petals are oblong, undulated, and of a purple colour. The stamens are alternately longer, and inflected. The capsule is elliptical and small.

Qualities. — Loosestrife in the dried state is inodorous, and has an herbaceous subastringent taste. In coction with water it renders the fluid mucilaginous; and the decoction strikes a black with sulphate of iron.

Medical properties and uses. — This plant is astringent and tonic. It has long been celebrated in Ireland as a remedy in diarrhœa; and has also been found useful in dysentery. It is always proper to give a purgative prior to its use being begun. The best form of giving it is that of decoction.

LYTTA. *Syst. Nat. Gmelin.* 2013.

Cl. 5. *Ord.* 1. Insecta Coleoptera *Linn.* Eleuterata. *Fabric.*

G. 215. *Feelers* filiform. *Palpi* four, unequal; the posterior ones clubbed. *Thorax* nearly round. *Head* inflected, gibbous. *Elytra* soft, flexible.

Species 1. Lytta *vesicatoria.* Blistering Fly.

Officinal. LYTTA. *Lond.* CANTHARIS VESICATORIA. *Edin.* CANTHARIS. *Dub.* Blistering or Spanish Fly. Cantharides.

Syn. Cantharides (*F.*) Spanische Fliegenoder Kanthariden (*G.*) Cantarelle (*I.*) Cantharidas (*S.*)

This insect is found on the privet, ash, elder, lilac, white poplar, and the tartarian honey-suckle, in Spain, Italy, France; and to a certain extent over all Europe. They are two-thirds of an inch in length, and one-fourth of an inch in breadth, oblong, and of a green, gold shining colour; with soft elytra or wing sheaths, marked with three longitudinal raised stripes, and covering brown membranous wings. The body is terminated by two small callous sharp spines; and on the head are two black, jointed feelers. When alive they have a fœtid odour.[1] They are gathered by smoking with brimstone the trees on which they are found; and catching them on a cloth spread underneath. They are sometimes simply shaken from the trees, and then killed by the steams of boiling vinegar, and dried either by the sun or in a stove.

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[1] *Λυθρον* Dioscoridis.

Blistering flies are imported from Sicily, but chiefly from Astracan, packed in casks and small chests. The best are of a lively fresh colour, a small size, and not mouldy, nor mixed with the Melolontha *vitis*; an insect resembling them in some degree, but possessing no vesicating property. It may be distinguished by its form, which is altogether more square than that of the Lytta, and by its black feet.[2] If the blistering flies have been properly dried, and are kept in a well-stopped glass bottle, they will remain unchanged in appearance, and retain their acrimony for a great length of time[3]: but sometimes, in spite of every precaution, they are attacked by a small worm, which, however, feeds on the inactive part only of the fly, reducing it to a powder, that still possesses the active quality of the entire insect. They soon putrefy when kept in a damp place; and, therefore, should be occasionally spread out to the air.

Qualities.—Blistering flies have a heavy disagreeable odour, and an acrid taste. Lewis found that their active constituents are soluble both in water and in alcohol; and that the residuum with these menstrua is inert. Thouvenel, Beaupoil, and Robiquet, have analysed the insect; but their inquiries lead to no very certain conclusions.

Thouvenel treated the entire flies with *water*, *alcohol*, and *ether* separately, submitting them to the press; and obtained the following results: 1st, Three-eighths of reddish yellow, very bitter extractive, affording by distillation an acid liquor: 2d, One-tenth of concrete, waxy, green oil, having the odour of the flies, and yielding by distillation a very sharp acid and a thick oil: 3d, One-fiftieth of concrete yellow oil, apparently the colouring matter of the insect: and 4th, One-half of solid parenchymatous matter. He imagines that the blistering principle resides in the green waxy oil; and that the strangury produced by blisters is the effect of the acid obtained from this oil by distillation.[1]

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[1] It is asserted that a person who sits under a tree on which many of these insects are, particularly at the time of copulation, experiences ardor urinæ, pain of the bladder, and sometimes ophthalmia.

[2] Fabricius thus describes the Melolontha; "*Maxilla* brevis cornea; apice multidentata. *Antennæ* lamellatæ. Melolontha *vitis*. Viridis, thoracis lateribus flavis, pedes nigri." Vide *Rœmer Gen. Insect.* t. 1. fig. 11.

[3] Van Swieten kept them upwards of thirty years, in a glass vessel not particularly well corked, and they still produced vesication.

Beaupoil in his researches found that an aqueous infusion of the flies, when exposed to the air, lets fall a yellow precipitate, exhales an ammoniacal odour, and reddens tincture of turnsole: the addition of ether or alcohol divides it into two parts; viz. a black gluey matter insoluble in alcohol, and a yellowish-brown, very soluble matter.[2] The black matter blistered the skin without affecting the urinary organs; the yellow matter did not blister when applied alone, but blistered quickly when united with wax; and a green matter, which he also obtained, acted under similar circumstances, but less actively.

Robiquet asserts that the flies, when recently collected, yield some uric acid. By treating them with water, alcohol, and ether, he obtained a peculiar matter, in the form of small crystalline micaceous plates, insoluble in water and in cold alcohol, but soluble in boiling alcohol and in ether; and very soluble in oils; on the presence of which the vesicatory property of the flies depend; and which, in combination with oil, might supersede their use. Dr. Thomson has named it *Cantharidin.*[3]

Medical properties and uses. — Blistering flies internally exhibited are powerfully stimulant and diuretic; and externally applied, rubefacient and epispastic. Notwithstanding their acrimony, they appear to have been given as an internal remedy so early as the time of Hippocrates, who prescribed them chiefly in cases of dropsy and amenorrhœa. They have a considerable effect on the urinary organs, even when externally applied; and unless their internal exhibition be conducted with great caution, they act with so much violence on the kidneys, bladder, and small intestines, as to produce bloody urine, purulent stools, insupportable pains of the abdomen, vomiting, and other symptoms of intestinal inflammation; convulsions, delirium, syncope, and death. They have, however, been successfully employed in dropsy, obstinate gleet[4], leucorrhœa, and incontinence of urine arising from paralysis of the sphincter vesicæ. The free use of diluents, as milk, almond emulsion, and mucilaginous solutions, is absolutely necessary during their employment to moderate their action. The tincture is the more proper form for internal use; or, if given in substance, the dose should not exceed one grain of the powdered flies, formed into a pill with opium or extract of henbane. But they require to be continued for some time, in order to prove beneficial.

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[1] *Annales de Chimie*, xlvii. 280

[2] From one ounce of cantharides he obtained, Of black matter 2 gros 2 grs. Yellow matter 1—2. Green matter 1—8. Parenchyma 4—36. Phosphate of lime 12 grains. Carbonate of lime 2 grains. Sulphate and muriate of lime 4 grains. Oxide of iron 2 grains, and an acid, the quantity of which was not ascertained. *Annales de Chimie*, xlviii. 33.

[3] Vide *System of Chemistry*, 5th edit. iv. p. 436. and *Ann. de Chim.* lxxvi. p. 308.

[4] Probably gleets were included in the term gonorrhœa by the old writers, who frequently mention cantharides as a remedy for gonorrhœa. Thus Boccone (*Museo di Fisica*, 1699) says, they were much used by the Sicilians in gonorrhœa.

Blistering flies, when applied to the skin, act as a local stimulant, first reddening and inflaming the part, and then producing from the exhalants a copious discharge of serum under the cuticle, so as to raise a blister. These effects they produce more certainly and completely than any vegetable acrid; and therefore they are more generally employed as a vesicatory than any other substance.

It is uncertain whether blisters were used by the ancients, who we know employed some epispastics; but in the hands of modern practitioners they are daily and successfully employed. Although their first operation is local, yet, under certain circumstances, the stimulus is sufficient to rouse the whole nervous energy, and excite the general system, so as to render their application useful in diseases of diminished excitement: and on this account, in deep-seated local affections, when the inflammatory diathesis is considerable, the force of the circulation must be diminished by bleeding, purging, or other evacuants, before blisters can be advantageously applied. The diseases of debility in which they are useful are low nervous fever, when accompanied with delirium, pale urine, frequent sighing, great anxiety, deafness, a fixed stare and glistening eyes. In palsy, and gutta serena, they are applied to the forehead over the supra-orbital nerve. They are found efficacious also in spasmodic and convulsive affections, from the irritation they produce overcoming the morbid irritation which induced the spasm. Blisters, by their local action, relieve internal inflammatory diseases, by altering the balance of the circulation; and, in part, by diverting the attention from the prior seat of pain. Hence their utility in ophthalmia, applied behind the ears, on the temples, or the forehead; in phrenitis, over the head; in cynanche tonsillaris, and in small-pox, when the swelling of the fauces affects respiration, upon or near the neck; and in phthisis, catarrh, hepatitis, pneumonia, gastritis, and other intestinal inflammations, immediately over the seat of pain.[1] In acute rheumatism, particularly that variety of it named sciatica, they have been found very useful. On the same principle caries in the bones and joints, or a disposition to it, is often cured by the repeated application of blisters. "Under their application the enlargements obviously subside; the crepitation between the bones, the consequence of the abrasion of the cartilages, ceases to be felt when the blister begins to operate, the use of the joint is effectually recovered, and anchylosis prevented."[1] A succession of blisters, also, to the vicinity of an inflamed organ is more beneficial than a protracted discharge from one; and a second blister often relieves after the first has failed. Blisters are contra-indicated in diseases of great debility, where there is a tendency to mortification; as in the low stages of petechial fevers, cynanche maligna, confluent small-pox, and malignant measles; and in dropsy, in which they are apt to occasion a very painful, dangerous erysipelas, and gangrene. Peculiar idiosyncrasies forbid their use in some persons; as they irritate, heat, produce thirst, pain, tremors, and sometimes convulsions. In those of irritable temperaments their application is often attended with strangury and bloody urine; and this effect is much increased if the blister be applied over an abraded surface, as a newly shaved head, or if the blister plaster be allowed to remain too long on after the blister has risen. To prevent strangury from the application of blisters, camphor has been erroneously regarded as a specific. It is more effectually prevented and relieved by copious dilution with milk, and mucilaginous fluids; and by fomentations of warm milk and water to the blistered part after the removal of the plaster: and much inconvenience of this nature may be prevented by interposing between the vesicatory and the skin, a piece of gauze, wetted with vinegar, and applied smooth and close over the plaster.

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[1] Contrary to the opinion of the older physicians, who imagined that the efficacy of blisters arose from the serous evacuation, experience has fully proved that their utility is in the ratio of their vicinity to the affected part.

The dose of the flies, when given internally is gr. j to grs. iij.

Officinal preparations. *Tinctura Lyttæ*. L. *Emplastrum Lyttæ*. L. *Emplastrum Cantharidis vesicatoriæ*. E. *Ceratum Lyttæ*. L. *Unguentum infusi Cantharidis vesicatoriæ*. E. *Unguentum Cantharidis*. D. *Unguentum Pulveris Cantharidis vesicatoria*. E.

MAGNESIÆ SULPHAS. *Lond.* SULPHAS MAGNESIÆ. *Edin.* SULPHAS MAGNESIÆ; *olim Sal catharticum amarum.* Dub. Sulphate of Magnesia. Bitter purging Salt.

Syn. Sulphate de Magnesie (*F.*) Schwefelsaure Magnesia (*G.*) Sale amaro; Ossisolfato di Magnesia (*I.*)

This salt is found native in a pure state[2]; but it is more commonly combined with gypsum[1]; and in solution in sea-water, and several mineral springs. It was first artificially obtained in England in 1675, from the evaporation of the water of the Epsom spring: whence it was named Epsom salt: and in 1700 it was made in considerable quantity from two springs at Shooter's-hill, in Kent[2]; but the discovery of it in bittern, or the residual brine after the crystallization of sea-salt, soon opened a more copious source from which it might be obtained at all times; and for many years past, all the sulphate of magnesia used in this country has been manufactured from bittern. This substance consists chiefly of muriate of magnesia, muriate of lime, some common salt, and a small portion of sulphate of lime; and therefore it is probable, that the sulphate of magnesia is obtained by decomposing the muriate by means of sulphate of iron, or sulphuric acid in some form, although some affirm that the bittern is only boiled down to a high point of concentration; when the sulphate of magnesia forms, and is purified by a second solution and crystallization. The sulphate found in the shops generally contains some muriate of magnesia, which renders it deliquescent; and consequently it requires to be preserved in close covered jars. It is often adulterated with Glauber salt, which is made to resemble Epsom salt, by stirring it briskly, when it is about to crystalise. It may be detected, by precipitating the magnesia by pure ammonia, aiding by heat; filtering, and evaporating the filtered fluid to dryness, by a heat sufficient to volatilize the sulphate of ammonia. If it contained glauber salt, the soda will remain fixed. Muriate of lime is detected by the oxalic acid.

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[1] Ford *on Diseases of the Hip-joint*, 53.

[2] In the mercury mines of Idria it is found crystallized, and named by the Germans *Haarsalz*. According to Klaproth, it contains 1 per cent. of oxide of iron. *Analyt. Ess.* 80.

Qualities.—Sulphate of magnesia is inodorous, and has a very bitter nauseous saline taste. It is usually in small needle-like crystals, but the form of its regular crystal is a quadrangular prism, acuminated by four planes. When pure it effloresces; and is soluble in its own weight of water at 60°, increasing the volume of the fluid rather more than 4-tenths, or a solution of ℥j of sulphate of magnesia in f℥j of water, measures eleven fluid drachms and a quarter. Heat expels its water of crystallization; and the mass is melted, but not decomposed; it loses merely its water of crystallization, and a minute portion of its acid. According to Bergman, 100 parts consist of 29·35 of sulphuric acid, 17 of magnesia, and 53·65 of water of crystallization.[3] Its specific gravity is 1·66. It is decomposed by the alkalies, and their carbonates, lime-water, the muriates of barytes and lime, nitrate of silver, and acetate and superacetate of lead, which are therefore incompatible with it in prescriptions.

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[1] In the gypsum quarries of Piedmont; and, as Proust relates, it abounds so much in Spain, that in Andalusia large tracts are covered with an efflorescence of it after floods. *Journ. de Physique*, xxxiii. 312.

[2] It is also made in Bohemia from the mineral water of Sedlitz.

[3] According to Dr. Henry, the composition is, acid 38, magnesia 18, and water 44 parts, in 100 of the salt.

Medical properties and uses.—This salt is purgative and diuretic. It operates readily without griping; and notwithstanding its nauseous taste, is generally retained by the stomach when it rejects almost all other things, especially when administered in small repeated doses largely diluted, or united with acidulated infusion of roses. In these forms it is a useful purgative in hypochondriasis, colica pictonum, ileus, puerperal fever, and in all acute diseases. It is also used as an adjunct to stimulating clysters. By moderate exercise in the open air, while taking this salt, the purgative effect is diminished, and its diuretic property increased. The dose is from ℥ſs to ℥ij dissolved in water, gruel, or any other vehicle; and taken either at once, or in divided doses frequently repeated.

Off preparations. *Enema Catharticum.* D. *Enema fœtidum.* D.

MALVA. *Spec. Plant. Willd.* iii. 774.

Cl. 16. *Ord.* 6. Monadelphia Polyandria. *Nat. ord.* Columniferæ *Linn.* Malvaceæ *Juss.*

G. 1290. *Calyx* double, the exterior three-leaved. *Capsules* numerous, one-seeded.

** *with angular leaves.*

Species 43. Malva *sylvestris.*[1] Common Mallow. *Med. Bot. 2d edit.* 554. *t.* 199. *Smith Flora Brit.* 740. *Engl. Bot.* 671.

Officinal. MALVA. *Lond.* MALVÆ SYLVESTRIS HERBA, FLORES. *Edin.* Mallow.

Syn. Mauve (*F.*) Käsepappel (*G.*) Malva (*I.*) Malvas (*S.*)

This is a perennial, indigenous plant, common over all Europe, flowering from May till August. The root is fusiform, branching, and of a whitish colour. The stem frequently erect, branched, round, hairy, and many-flowered. The leaves are alternate, petiolate, cordate, divided into seven lobes, plaited, somewhat rough, and crenate; the upper ones are almost palmate. At the base of each footstalk are two stipules. The flowers, which stand on slender hairy peduncles, are large; composed of five inversely cordate purple petals, three times longer than the calyx, which is hispid. The capsules are from ten to fifteen in number, of a rounded kidney form, crustaceous, brittle, close all round, of a dark straw colour, excavated, and wrinkled on the back. The seeds are kidney-shaped, ash-coloured, and furnished with an arillus which opens inwardly.

Qualities.—Common mallow is inodorous, and has a weak, herbaceous, mucilaginous taste. The decoction is precipitated by acetate and superacetate of lead; and is nearly a simple solution of vegetable mucus.

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[1] Μαλαχὴ Græcorum.

Medical properties and uses.—This herb is demulcent. Its decoction is employed in dysentery, ischuria, strangury, and nephritic complaints, but is in every respect inferior to that of althea root. It is chiefly used in the form of enema in tenesmus, and nephritic colic: and as cataplasms and fomentations in phlegmonous inflammation.

MANGANESIUM. Manganese.

This is a brittle gray coloured metal, somewhat resembling iron in its external aspect, of a granular texture, and not possessing ductility or malleability. It has not been discovered native in its metallic state, but its ores are found in most of the countries of Europe both in primitive and transition mountains. Manganese in the ore is found

A. United with oxygen:

i. oxidized	Sp. 1. *Gray manganese ore.* Var. *a.* Radiated. *b.* Foliated. *c.* Compact. *d.* Earthy. 2. *Black manganese ore.*
—*a.* and combined with carbonic acid.	3. *White manganese ore.* 4. *Red manganese ore.*
—*b.* ——— with sulphur.	5. *Sulphuret of manganese.*
c. ——— with phosphoric acid.	6. *Phosphate of manganese, and iron.*

Of these species the first only has been introduced into the list of materia medica.

Officinal. MANGANESE.[1] *Dub.* Manganese, or more properly Black Oxide of Manganese.

Syn. Manganese (*F.*) Braunstein (*G.*) Manganese (*I. S.*)

Under the name of black oxide of manganese are implied all the varieties of the first species. It was discovered in England by Boyle, in the beginning of the 17th century, but was regarded as a modification of iron ore, till the separate experiments of Scheele and Bergman, published in 1774, proved it to be an oxide of a peculiar metal; which Gahn afterwards succeeded in obtaining in its metallic state. It is found in Great Britain, Germany, Switzerland, the north of Italy, and France.

The greater part of the black oxide of manganese used in England is obtained near Exeter in Devonshire, in Cornwall, and at Howth, near Dublin. It occurs crystallized and amorphous; and is generally in combination with small portions of oxyde of iron, carbonate of lime, silex, and barytes.

Qualities.— Black oxide of manganese differs in its external characters. Its usual colour varies from iron-gray to black; when crystallized it is shining, but when amorphous devoid of lustre. Its texture is radiated, foliated, compact or earthy. None of the varieties are very hard; all of them are brittle, and several of them soil the fingers. Their specific gravity varies from 3·5 to 4·7. One hundred parts of the black oxide consist of 71·23 of metallic manganese, and 28·67 of oxygen. Exposed to the heat of ignition, all the varieties afford oxygen gas; and when mixed in powder with sulphuric acid, they afford it at a low temperature. It also parts with its oxygen to muriatic acid, converting it into oxymuriatic acid[1]: or, according to the theory of Sir H. Davy, the hydrogen of the muriatic acid is attracted by the oxygen of the oxide of manganese, and chlorine is evolved.

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[1] This term is improperly used by the Dublin College: for although the black oxide was originally named *manganese*, and is still so named in commerce; yet, in a professedly scientific work, more accuracy of nomenclature is required.

Medical properties and uses.—This metallic oxide is only used for procuring oxygen gas; and for fumigation in cases of infection. To procure oxygen gas, a portion of the oxide is put into an iron retort, fitted with a long curved tube, the extremity of which being placed under an inverted jar filled with water in a pneumatic trough, the retort is put into a common fire and exposed to a full red heat. The caloric at this high temperature weakens the affinity between the manganese and the oxygen with which it unites, and causing it to assume a gaseous state, the oxygen gas is transmitted through the water, and collected in the jar. From the necessity of oxygen for carrying on the process of animal respiration, much benefit was expected from the breathing oxygen gas in disease; but experience has not confirmed the high expectations which were formed of its powers. It certainly increases the force and velocity of the pulse; and has been exhibited with seeming advantage in asthma, chlorosis, scrofula, typhoid fevers, and other diseases of debility. Diluted with from ten to twenty parts of atmospheric air, one or two quarts of it may be breathed at intervals in the course of the day.

But a more certain benefit is obtained from the use of this oxide of manganese in fumigations. Medicine is indebted to Morveau for the discovery of this mode of destroying infection, and the numerous instances in which it has proved beneficial have fully established its use. For a fumigation the following ingredients are required: common salt ℥iv, oxide of manganese in powder ℥j, sulphuric acid f℥j, and water f℥ij; the water and acid must be mixed together, and then poured over the other ingredients in a China basin, which should be placed in a pipkin of hot sand. The doors and windows of the room to be fumigated, must be closely shut for two hours after the charged basin has been placed in it; then thrown open, and a current of air allowed to pass through the room.

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[1] The greatest consumption of black oxide of manganese is for the formation of the oxymuriatic acid, as employed in the art of bleaching.

MANNA. Vide *Fraxinus Ornus.*

MARRUBIUM. *Spec. Plant. Willd.* iii. 109.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticilatæ *Linn.* Labiatæ *Juss.*

G. 1111. *Calyx* salver-shaped, rigid, ten-streaked. *Corolla,* upper lip bifid, linear, and straight.

** *with ten-teethed calyxes.*

Species 8. M. *vulgare.*[1] White Horehound. *Med. Bot. 2d edit.* 332. *t.* 118. *Smith Flora Brit.* 636. *Engl. Bot.* 410.

Officinal. MARRUBIUM. *Lond.* MARRUBII VULGARIS HERBA. *Edin.* MARRUBIUM ALBUM; FOLIA. *Dub.* Horehound leaves.

Syn. Marrube blanc (*F.*) Weisser andorn (*G.*) Marrubio (*I.*) Marubio (*S.*)

White horehound is an indigenous, perennial plant, growing in waste grounds, and flowering in July. The root is fibrous, sending up numerous stems about eighteen inches high, quadrangular, erect, and very downy. The leaves are in pairs upon broad footstalks, rounded, crenate, wrinkled, hoary, and woolly on the under surface. The flowers are white, in crowded axillary whorls, sessile, villous; and furnished with setaceous awned bractes. The calyx is tubular, furrowed, and divided at the margin into ten narrow segments, which are hooked at their points: the corolla is tubular, compressed, opening at the mouth into two lips, the upper of which is narrow and cloven; the under broader, reflected, and three-cleft, with the middle segment broad, and scolloped. The filaments are two long and two short, with simple anthers, within the tube; and the style is slender, with a cloven stigma. The seeds are four, at the bottom of the calyx.

Qualities. — Horehound dried has an aromatic odour, which however is soon lost by keeping; and a bitter taste. Both water and alcohol extract its virtues. The infusion reddens tincture of litmus, gives a deep olive green precipitate with sulphate of iron, a brown with nitrate of silver, and a pale yellow with muriate of mercury: acetate and superacetate of lead do not affect it. The active principles of horehound, therefore, appear to be a bitter extractive, volatile oil, and gallic acid.

Medical properties and uses. — Horehound is tonic, diuretic, and laxative. It was formerly much used in pulmonary affections, and is still a popular remedy for asthma and obstinate coughs. It loosens the belly when taken in large doses, and was consequently recommended in jaundice, cachexies, menstrual obstructions, and hysteria; but its powers are not found by modern practitioners equal to the account the ancients gave of them, and therefore it is very seldom prescribed.

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[1] Πρασιον Dioscoridis. Lemery says the name is derived from the Hebrew word *Marrob,* which means a bitter juice.

The dried herb may be given in powder, in doses of from ʒſs to ʒj; or of the expressed juice of the fresh plant from f℥ſs to f℥jſs may be taken twice or thrice a day. It is also used in the form of infusion.

MASTICHE. Mastich. See *Pistacia Lentiscus.*

MEL. *Lond. Edin.* Honey.

Syn. Miel (*F.*) Gemeiner Honig (*G.*) Mele (*I.*) Miel (*S.*) Ussub (*Arab.*) Medhú (*H.* and *San.*)

Honey is collected by bees from the nectaries of [1] flowers, in which it is abundantly secreted; but it probably undergoes some change within the insect before it is excreted by it, and deposited in the comb. That it does not however undergo the process of digestion as food is likely, for the honey or sugar on which bees are fed during winter is not again excreted as honey; and the flavour of honey varies according to the nature of the flowers from which it collected. Thus the honey of Minorca, Narbonne, and England are known by their flavours; and the honey prepared in different parts even of the same country differs.[2] It is separated from the comb by dripping, and by expression: the first method affords the purest sort; the second separates a less pure honey; and a still inferior kind is obtained by heating the comb before it is pressed. When obtained from young hives, which have never swarmed, it is denominated virgin honey. It is sometimes adulterated with flour, which is detected by mixing it with tepid water; the honey dissolves, while the flour remains nearly unaltered.

Qualities.—Honey has a peculiar saccharine aromatic odour; and a sweet acidulous sharp taste. In colour it varies from white or yellowish white, to a pretty deep shade of amber or golden yellow: in consistence, from the fluidity of limpid oil to the stiffness of soft suet: and when the more limpid kind is kept, partly crystallizes into little irregular concretions. It evidently contains sugar, mucilage, wax, and an acid; and occasionally some essential oil, as in the perfumed honey of the Crimea. Honey is soluble in water, and partially in alcohol; and, like sugar, passes into the vinous and acetous fermentation. When heated over a slow fire it throws up a scum; and if the heat be continued so as to produce evaporation, the vapour is inflammable; and the honey becomes brown, and acquires an unpleasant flavour, which is strong in proportion to the degree of temperature employed, Lowitz found that the addition of charcoal to a solution of honey deprives it of odour, taste, and colour; but the colour again returns when the solution is evaporated. Cavezzali separated the sugar by first melting the honey, then adding carbonate of lime (egg-shells) in powder as long as any effervescence appeared; and, after separating a scum which forms by rest, filtering it, and setting it aside to crystallize. The crystals he purified by washing them with alcohol.[1] Proust separated it from a ready granulated honey by the action of alcohol.[2] Nitric acid converts honey into oxalic acid.

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[1] The nectary is a glandular organ of the corollas of flowers. In many flowers it forms part of the petals themselves; in others it is a distinct organ. It is not easy to assign the use of honey in the vegetable œconomy.

[2] In some parts of Asia and America a poisonous honey is met with, which probably owes its deleterious properties to the flowers on which the bees feed.

Medical properties and uses. — Honey is laxative, and externally detergent and stimulant. Simple honey is seldom ordered as an internal medicine; indeed, when freely eaten as food it passes off quickly by stool, and induces cholic in some habits; on which account, simple syrup should perhaps be preferred in all cases for forming medicinal preparations for internal use. As a local stimulant, it is employed in glysters; and forms an excellent adjunct to gargles in cynanche, and aphthous ulceration of the mouth and fauces. It is also a useful detergent to foul ulcers.

Officinal preparation. *Mel despumatum.* L. D.

MELALEUCA. *Spec. Plant. Willd.* iii. 1428.

Cl. 18. *Ord.* 3. Polyadelphia Icosandria *Nat. Ord.* Hesperideæ *Linn.* Myrti *Juss.*

G. 1392. *Calyx* five-cleft, half superior. *Corolla, Petals* five. *Filaments* numerous, connate in five bodies. *Style* one. *Capsule* half-covered, three-celled.

Species Nova. M. *Cajuputi.*[3] Cajuputi Melaleuca. *Rumphius* (arbor alba minor) *Herbar. Amboinense,* ii. *lib.* 2. *cap.* 26. *t.* 17.

Officinal. CAJUPUTI OLEUM *Lond.* MELALEUCÆ LEUCADENDRI OLEUM-VOLATILE. *Edin.* OLEUM CAJUPUT. *Dub.* Cajuputi oil.

Syn. Cajeput (*F.*) Kajeputohl (*G.*) Cajeput (*I.*) Cajuputa (*Malay*) Kyäpu otie tylum (*Tam.*)

The tree which yields this oil is a native of Amboyna, and the south part of Borneo, where it grows very abundantly in dry arid places. It is named Cajuputa in the Malay language; and also by the natives *Daun Kitsjil,* and *Caju-Kilan.* It is a small tree, in some situations rather a shrub than a tree with a running root, often arched and half above the ground. The stem is covered with a rough, pale, lamellated bark. The leaves are alternate on short petioles, not unlike those of the willow, about three inches long, and little more than half an inch broad, lanceolate, and somewhat falcated; entire, smooth, three-nerved, firm, dry, fragile, of a pale yellowish green colour, and having a very grateful odour. The flowers are white, sessile, and accompanied with minute, ovate bractes. The calyx is tubular, five-toothed, and one half deciduous; the petals are roundish, and concave; and the bundles of the filaments, which are long, filiform, and bearing small ovate anthers, are fixed within the tube of the calyx. The germen is inferior, roundish, crowned with a simple slender style longer than the filaments; and becomes a three-celled capsule, containing many small, oblong, angular seeds.[1]

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[1] *Annales de Chimie,* xxxix. 110.

[2] *Journal de Physique,* lix. 428.

[3] As the specimens of the tree which yields the true Cajuputi oil, which were sent home by Mr. Christopher Smith, differ from the *M. Leucadendron,* which was formerly supposed to yield it, and agree with the *Arbor alba minor* of Rumphius; Drs. Maton and Smith have fixed this as a new species under the name of M. *Cajuputi.*

To prepare the oil, the leaves are collected in a hot dry day, and put into thoroughly dry bags; in which nevertheless they soon spontaneously heat and become moist, as if macerated in water. They are then cut in pieces, infused in water, and left to ferment for a night; after which they are distilled. The quantity of oil they yield is very small, scarcely more than three fluid drachms being obtained from two bags of leaves.[2] When newly drawn it is very limpid, pellucid, and volatile; and, Rumphius says, smells strongly of cardamoms, but is more pleasant. It is generally imported in copper flasks or canisters; but lately some has been brought to us in quart glass bottles. On account of the high price of real Cajuputi oil, it is said to be often adulterated with oil of turpentine, and coloured with resin of milfoil.

Qualities. — The odour of this oil, as it is brought to us, is at first powerful, and similar to that of a mixture of oil of turpentine and camphor, but it soon becomes extremely fragrant and agreeable: the taste is pungent, and resembles very much that of camphor. It is limpid, transparent, and generally of a blueish green colour, which is said to be partly derived from the copper of the flasks. When dropped on the surface of pure water, it diffuses itself over it, and very soon completely evaporates, which is a good test of its purity; and it burns rapidly, without leaving any residuum. Like other volatile oils, it is soluble in alcohol, and partially in water.

Medical properties and uses. — Cajuputi oil is a highly diffusible stimulant, antispasmodic, and diaphoretic.[3] When taken into the stomach, it produces a sensation of heat, fills and quickens the pulse; and soon afterwards a copious sweat breaks out. It is efficaciously given in dropsy, chronic rheumatism, palsy, hysteria, flatulent colic, and other spasmodic and nervous affections. As a local and external stimulant, it is employed diluted with olive oil, as an embrocation to allay the pain of gout and rheumatism, and to restore vigour to joints after sprains. When put into a carious tooth, it lulls the pain of tooth-ach; and we have seen much benefit derived from rubbing it on the temples, in defective vision from a weakened state of the eyes. The dose is three or four drops on a lump of sugar.

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[1] The natives of the Moluccas macerate the leaves and flowers in fresh oil, and afterwards impregnate it with the smoke of benzoin. This preparation they call *Minjac Money*, or odorated oil, and use it as an unguent for the head. *Rumphius Herb. Amboin.* l. c.

[2] *Rumphius.*

[3] "Hujus olei binæ guttæ cum cerevisia vel vino propinatæ sudores excitant vehementes, cui fini apta medicamenta India exhibet perpauca." *Rumphius.*

MELISSA. *Spec. Plant. Willd.* iii. 146.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticillatæ *Linn.* Labiatæ *Juss.*

G. 1118. *Calyx* dry, nearly flat above: with the upper lip subfastigiate. *Corolla*, upper lip somewhat arched, bifid; lower lip with the middle lobe cordate.

Species 1. Melissa *officinalis*.[1] Officinal or Common Balm. *Med. Bot. 2d edit.* 335. *t.* 119.

Officinal. MELISSÆ OFFICINALIS FOLIA. *Edin.* Balm leaves.

Syn. Melisse (*F.*) Melisse (*G.*) Melissa (*I.*) Balsamina (*S.*)

Balm is a perennial plant, a native of the south of Europe, growing in mountainous situations, and flowering from July to September. It is cultivated in our gardens.[2] The root is fibrous, and sends up annual stems, which rise about two feet high, and are branched, quadrangular and smooth. The leaves are opposite in pairs, of a bright green colour, ribbed, deeply serrated, and cordate; the lower ones on long foot-stalks, and the upper nearly sessile. The flowers, which are in small axillary bunches forming semi-whorls, stand on slender peduncles, at the base of which are small, oblong, notched, hairy bractes. The calyx is tubular and pentangular; the upper lip tridentate; the lower shorter, and cut into two acute teeth. The corolla, which is tubular, of a yellowish white colour, with the upper lip shorter, and notched, and the lower three-cleft, encloses the anthers; the seeds are four, ovate, and placed at the bottom of the calyx.

For medicinal use the herb should be cut before it flowers, as it is then more odorous.

Qualities.—The recent plant has the agreeable odour of lemons, which is lost in drying; and an austere, slightly aromatic taste. In distillation with water, it yields a small portion of a yellow essential oil, on which its odour depends. The watery infusion tastes rough; reddens slightly litmus paper; and affords with oxysulphate of iron a deep olive, with nitrate of silver a deep brown, and with superacetate of lead a copious greenish white precipitate.

Medical properties and uses.—Officinal balm is stomachic and diuretic. It was formerly prized as a corroborant in hypochondriacal and nervous affections; but it is now used only in the form of tea, as a grateful diluent in fevers.

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[1] Μελισσοφυλλον Dioscoridis, bees being very fond of it.

[2] It was cultivated by Gerarde in 1596.

MENTHA.[1] *Spec. Plant Willd.* iii. 74.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticillatæ *Linn.* Labiatæ *Juss.*

G. 1102. *Corolla* not quite equal, four-cleft; the broader segment emarginate. *Stamens* upright, distant.

* *Spiked.*

Sp. 7. M. *viridis.* Spearmint. *Smith* (*spec.* 3.) *Flora Brit.* 612. *Med. Bot. 2d edit.* 338. *t.* 121.

** *Capitate.*

Sp. 13. M. *piperita.* Peppermint. *Smith* (*spec.* 4.) *Flora Brit.* 613. *Med. Bot. 2d edit.* 336. *t.* 120. *Eng. Bot.* 461.

*** *Verticillate.*

Sp. 20. M. *Pulegium.* Pennyroyal. *Smith* (*spec.* 12.) *Flora Brit.* 624. *Med. Bot. 2d edit.* 342. *t.* 122.

1. MENTHA VIRIDIS.[2]

Officinal. MENTHA VIRIDIS. *Lond.* MENTHA SATIVA; FOLIA. *Dub.* Spearmint.

Syn. Baume verte (*F.*) Fraüenmurze (*G.*) Menta Romana (*I.*) Menta (*S*)

This is an indigenous perennial plant, growing in marshy places, and flowering in August. For medicinal purposes, it is cultivated to a considerable extent. Dr. Smith enumerates four varieties of the species, the first of which is our plant. The root is creeping; the stem quadrangular, and foliaceous, rising about two feet in height, erect, smooth, and branching. The leaves are opposite, nearly sessile, lanceolate, about two inches and a half long, and an inch broad; of a deep green colour above, paler beneath, pointed, serrated, smooth, and sometimes a little hairy underneath: the flowers are supported on smooth partial flower-stalks, verticillated, in long pointed panicled spikes; furnished with setaceous, ciliated, lanceolate bractes, longer than the flowers: the calyx is cylindrical and furrowed, with five nearly regular teeth: the corolla funnel-shaped, tender, smooth, and of a purple colour: the stamens are varying in length, with roundish anthers; and the style, which is filiform, with a bifid divaricated stigma, rises from a four-cleft germen: the seeds are four, small, and generally abortive, owing to the viviparous nature of the roots.

For medicinal use, spearmint is generally cut just as the flowers appear; but for obtaining the essential oil, the flowering plant is preferred. It should be cut in very dry weather.

Qualities. — Spearmint has a strong aromatic odour, and a warm slightly bitter taste; neither of which qualities is impaired by drying. Both alcohol and water extract its virtues; and in distillation with water an essential volatile oil is obtained.

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[1] Μινθη Dioscoridis.

[2] Hæc species dignoscitur pedicellis semper glaberrimis. *Smith Flor. Brit.* 613.

Medical properties and uses.—Spearmint is stomachic and carminative. The infusion is serviceable in allaying sickness and vomiting in a weakened state of the stomach; and is a common diluent in febrile diseases.

Officinal preparations. *Aqua Menthæ viridis.* L. D. *Infusum Menthæ comp.* D. *Oleum Menthæ viridis.* L. D. *Spir. Menthæ viridis.* L.

2. MENTHA PIPERITA.

Officinal. MENTHA PIPERITA. *Lond.* MENTHÆ PIPERATÆ HERBA. *Edin.* MENTHA PIPERITIS; HERBA. *Dub.* Peppermint.

Syn. Menthe poivrée (*F.*) Ofeffermünze (*G.*) Menta piperita (*I.*)

Peppermint is an indigenous perennial plant, growing in moist places, and flowering in August and September. It is generally cultivated for medicinal use; particularly about Mitcham in Surry[1], whence the London market is chiefly supplied. There are three varieties of peppermint, the first of which is the officinal plant. The root is creeping: the stem quadrangular and channelled, nearly upright, and about two feet high, branching, purplish, and rather hairy, with the hairs bent backwards: the leaves are of a dark green colour, opposite; petiolate, ovate, rather pointed, serrated, the upper side smoother and less pubescent than the under, which is paler, with white and purple veins: the flowers are in terminal spikes, solitary, almost capitate, interrupted beneath, with the lower whorl more remote, and on a footstalk: the bractes are lanceolate and ciliated: the calyx is furrowed, tender, studded, with glandular points, the base entirely naked, very smooth, and five-cleft, with the teeth of a blackish purple colour, and ciliated: the corolla is purple: and conceals within its tube the anthers, which are on short filaments: the germen is four-cleft, with a filiform style longer than the corolla, and furnished with a bifid stigma.

Dr. Smith supposes that this plant was discovered by Doctor Eales; and on examining the Linnean Herbarium, now in his possession, he found that the Mentha *piperita*, described by Linnæus, was not our officinal plant, but merely a variety of the M. *hirsuta*, with the odour of peppermint. "The cultivators of the plant observe, that to keep up its quality, the roots must be transplanted every three years; otherwise it degenerates into the flavour of spearmint."[2] If the plant be cut in wet weather it changes to black, and is little worth.

Qualities.—The odour of both the recent and dried plant is penetrating, grateful, in some degree resembling camphor; and the taste pungent, warm, glowing, and bitterish, followed by a sensation of coldness in the mouth. These qualities depend on an essential oil and camphor. The oil can be obtained separate by distillation in water, is of a yellowish colour, and holds the camphor in solution.

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[1] Considerably more than one hundred acres of this herb are grown in the parish of Mitcham; but the greater part of the peppermint is made into a *liqueur*, which is sold as a dram in London. *Stevenson's Survey*, 377, 378.

[2] *Linnean Transactions*, v. 176.

Medical properties and uses. Peppermint is tonic, antispasmodic, and carminative. It is chiefly used to allay nausea and griping, to relieve flatulent colic, and in hysteria: or as a vehicle to cover the nauseous taste of other medicines; but to many palates it is extremely disagreeable. It may be given under the form of watery infusion; but the distilled water and the essential oil are generally preferred.

Officinal preparations. *Aqua Menthæ piperitæ.* L. E. D. *Oleum Menthæ piperitæ.* L. E. D. *Spiritus Menthæ piperitæ.* L. E.

3. MENTHA PULEGIUM.

Officinal. PULEGIUM. *Lond.* MENTHÆ PULEGII HERBA. *Edin.* PULEGIUM; HERBA. *Dub.* Pennyroyal.

Syn. Menthe peuliot (*F.*) Polei (*G.*) Puleggio (*I.*) Poleo (*S.*)

This is an indigenous perennial plant, growing on heaths and in moist meadows, and flowering in September. Like the other mints, it is cultivated for medicinal purposes; and becomes more luxuriant and erect. The stem is obtusely quadrangular, trailing, branching, and somewhat hairy: the leaves are petiolate, small, obtuse, bluntly serrated, and in a small degree hairy underneath: the flowers, which are supported on stalks covered with short thick hairs, are in sessile whorls, numerous, and many-flowered; and without bractes: the calyx is of a purplish green colour, tender, furrowed, and covered with thick short hairs: five-cleft, with the teeth pointed, unequal, and ciliated: the corolla is twice the length of the calyx, purple, four-cleft, with the base white and externally villous: the stamens are erect, and longer than the corolla; and the germen similar to that of the former species.

Qualities—The odour is similar to that of spearmint, but less fragrant; the taste aromatic and pungent, with a slight flavour of camphor. These qualities reside in a very volatile essential oil, which rises in distillation with water.

Medical properties and uses.—Pennyroyal was formerly regarded as emmenagogue, expectorant, and diaphoretic; and was in repute for promoting the uterine evacuation, and relieving hysteria, hooping-cough, and asthma; but it is now justly considered of no value, and seldom used in regular practice.

Officinal preparations. *Aqua Pulegii.* L. E. D. *Oleum Pulegii.* L. D. *Spiritus Pulegii.* L.

MENYANTHES. *Spec. Plant. Willd.* iii. 810.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Preciæ *Linn.* Lysymachiæ. *Juss.*

G. 299. *Corolla* hirsute. *Stigma* cloven. *Capsule* one-celled.

Sp. 4. M. *trifoliata.* Buckbean. *Med. Bot.* 2d.ed. *t.* 97. *Smith Flor. Brit.* 225. *Engl. Bot.* 405.

Officinal. MENYANTHES. *Lond.* MENYANTHIS TRIFOLIATÆ FOLIA. *Edin.* TRIFOLIUM PALUDOSUM. *Dub.* The leaves of Buckbean.

Syn. Menianthe (*F.*) Bitterklee (*G.*) Trifolio fibrino (*I.*) Menyanthes de tres en rama (*S.*)

This is one of the most beautiful of our indigenous plants It is a perennial, not uncommon in watery situations, in a black boggy soil, flowering in June and July. The root is long, round, fibrous, and of a black colour; the stems are spreading, branched, and clothed with sheathing footstalks, each of which supports a ternate leaf, formed of three obovate smooth, bluntly toothed leaflets, of a beautiful green on the upper surface, and pale beneath: the flower stalk, which springs from within the sheath of a leaf, is longer than the leaves, erect, smooth, round, bearing a thyrsus of about ten flowers, accompanied by small ovate entire bractes: the calyx is obtusely five-toothed; the corolla a funnel-shaped petal, cleft into five deep segments, which are white, tipped with rose colour, and closed within with long fleshy shaggy fibres on their upper side: the anthers are sagittate, and of a red colour: the germen round: and the stigma cloven and notched, on a slender style twice the length of the stamens.

Qualities. — The leaves of buckbean have a faint disagreeable odour, and an intensely bitter nauseous taste, which is extracted by infusion with water.

Medical properties and uses. — Buckbean is tonic, diuretic, and purgative. It has been used with seeming benefit in remittent and intermittent fevers, rheumatism, arthritic affections, and in cachectic and cutaneous diseases. In large doses it is apt to excite vomiting. The dose of the dried leaves powdered, is from ℈j to ʒj; or of an infusion made with ʒſs of the dried leaves, and boiling water Oſs, from f℥j to f℥jſs may be taken three or four times a day. It is adviseable to unite some aromatic with either of these forms.

MEZEREI CORTEX. Mezereon Bark. Vide *Daphne.*

MOMORDICA. *Spec. Plant. Willd.* iv. 601.

Cl. 21. *Ord.* 8. Monœcia Monadelphia. *Nat. ord.* Cucurbitaceæ.

G. 1739. Male. *Calyx* five-cleft. *Corolla* five-parted. *Filaments* five. Female. *Calyx* five-cleft. *Corolla* five-parted. *Style* trifid. *Gourd* opening elastically.

Species 13. M. *Elaterium.*[1] Squirting Cucumber. *Med. Bot.* *2d edit. t.* 72.

Officinal. ELATERII POMA.[2] *Lond.* ELATERIUM. *Edin.* ELATERIUM; FRUCTUS. *Dub.* The fruit of the Wild Cucumber: Elaterium.

Syn. Concombre sauvage (*F.*) Esselsgurhen (*G.*) Cocomero salvatico (*I.*) Cohombrillo (*S.*)

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[1] *Σικυς αγριος* Dioscoridis.

[2] The London College have erred in styling the fruit an apple, as it is evidently a *pepo* or gourd.

This species of momordica is a perennial, native of the south of Europe, flowering in June and July. It is cultivated in England, but does not survive the severity of our [1] winters. The root is large and fleshy, sending forth several thick rough trailing stems, which branch and extend three or four feet every way: the leaves are on long petioles, large, rough, of a grayish green colour, and cordate: the flowers are axillary, similar in appearance to those of the common cucumber, but smaller, of a pale yellow colour, with a greenish base: the male flowers stand on short peduncles, but the female sit on the germen, which is inferior: the fruit into which it swells has the appearance of a small oval cucumber, of a grayish colour, and covered with prickles. When fully ripe it quits the peduncle, and casts out the seed and juice, with great force and to a considerable distance, through the hole in the base where the footstalk is inserted.

For medicinal use the fruit is gathered in September just before it is ripe; and the clear juice which runs from it, and that obtained by the expression of the fruit, are inspissated, and form the elaterium of the shops.

Qualities. — The juice is nearly inodorous, and has a very slightly bitter taste. It deposits by rest a considerable portion of feculent matter; for an account of the nature of which see *Extractum Elaterii* among the Preparations.

Medical properties and uses. — This fruit is a very violent cathartic. It was much employed by the ancients, who extolled it as highly efficacious in melancholic and maniacal attacks. They used the root also in similar cases. It is still frequently given in dropsies; and although when incautiously given, it may bring on a dangerous hypercatharsis, yet, properly prescribed, it is the best hydragogue with which I am acquainted. The extract is always employed in preference to the recent fruit.

Officinal preparation. — *Extractum Elaterii.* L. E. D.

MORUS. *Spec. Plant. Willd.* iv. 368.

Cl. 21. *Ord.* 4. Monœcia Tetrandria. *Nat. ord.* Scabridæ *Linn.* Urticæ *Juss.*

G. 1664. Male. *Calyx* four-parted. *Corolla* 0.
Female. *Calyx* four-leaved. *Corolla* 0. *Calyx* becoming a berry. *Seed* one.

Species 5. M. *nigra.* Common Mulberry tree. *Med. Bot. 2d ed.* 712. *t.* 243.

Officinal. MORI BACCÆ. *Lond.* Mulberries.

Syn. Murier noir (*F.*) Schwarze Maulbeeren (*G.*) Morone o Gelso (*I.*) Moras (*S.*)

This species of mulberry is a native of Persia, whence it was brought to Italy, and gradually spread over Europe. It is now abundantly cultivated in this country, flowering in June, and ripening its fruit in September. The tree, which seldom exceeds thirty feet in height, is covered with a brownish gray bark: the leaves are numerous, on short footstalks, cordate, serrated, veined, about three inches long, and nearly as broad; rough on the upper surface, which is of a deep green colour, and covered with minute warts; and paler and villous underneath. The male flowers, which are on the same tree as the female, are in close roundish catkins, composed of caducous florets, which consist of four concave, oval, erect, calycinal leaves, inclosing four filaments bearing simple anthers: the female flowers contain a roundish germen, crowned with two divaricated styles furnished with simple stigmas, inclosed in a calyx of four ovate concave erect leaves; which, after flowering, swell, become succulent and coloured, investing the seed; and many of them being crowded together on one peduncle form a spurious compound berry, that has the appearance of a real succulent berry composed of a number of smaller berries.[1]

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[1] It was cultivated by Gerarde in 1596.

Qualities.—Mulberries are inodorous, have a sweet acidulous taste, and abound with a deep blood red juice. Hermbstadt found that their acidulous quality depends on the presence of tartaric acid, and I find they contain also jelly and mucus.

Medical properties and uses.—This fruit is cooling and laxative; and, when not too ripe, allays thirst, and proves exceedingly grateful in febrile diseases. It is seldom, however, used medicinally; and, when eaten too freely as an article of food, is apt to occasion diarrhœa.

Officinal preparation. *Syrupus Mori.* L.

MOSCHUS. *Syst. Nat. Gmelin.* i. 172.

Cl. 1. *Ord.* 5 Mammalia Pecora.

G. 28. *Horns* none. *Fore teeth* eight in the lower jaw. *Tusks* one on each side in the upper jaw, projecting out of the mouth.

Sp. M. *moschiferus.* The Musk Deer. *Pennant Quadr.* 56. *t.* 10. *f.* 1.

Officinal. MOSCHUS. *Lond. Edin. Dub.* Musk.

Syn. Musc (*F.*) Bisam (*G.*) Muschio (*I.*) Almizcle (*S.*) Meshk (*Arab. & H.*)

This animal is an inhabitant of the alpine mountains of the east of Asia, particularly those which divide Thibet from India. It is a solitary animal, living among the rocks, and frequenting the highest tops of the snowy peaks; very timid, and difficult to be taken. The length of the full grown animal scarcely ever exceeds three feet, and in its general aspect it resembles the deer; the head is elegant: the fleece coarser than that of the stag, but very light and soft, and varying in colour at different seasons of the year, and different periods of life, chiefly from brown to nearly black, hoary underneath, and sometimes, but rarely, whitish: the tail is very short. Between the navel and the prepuce is an oval bag, flat on one side, and convex on the other, about three inches long, and two broad, projecting, with a very small orifice, and beset with short hairs. This is the musk bag: it is empty in the young animal; but in the adult contains from ʒjſs to ʒij of musk. The animal often expresses part of the contents of the bag, when it becomes too full, by rubbing itself against stones; and the matter thus ejected is said to be a purer musk than that which is brought to this country.

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[1] It is a curious fact, that two mulberry trees growing near each other, bear generally more fruit, and that of a finer quality, than if planted alone. This is supposed to be owing to the male flowers in one of the trees being more effective than those of the other.

Musk is imported into England from China in caddies, which contain from twenty to sixty and one hundred ounces each; but an inferior kind is brought from Bengal, and a still baser sort from Russia. The best is that which is in the natural follicle, or the *pod* as it is denominated in mercantile language. This is a sac or bag about the size of a pigeon's egg, of a brownish colour, lined with a very thin membrane, and covered externally with coarse hairs. The musk itself is in grains concreted together, dry, yet slightly unctuous, and free from grittiness when moistened and rubbed between the fingers, or chewed.

As musk is a very high-priced article, it is often adulterated. When this is the case, the bag, which should not have any appearance of having been opened, appears, if narrowly examined, slit or punctured in several places, through which sand, lead, and other heavy matters are inserted. The musk is sometimes nearly all abstracted, and a mixture of dried blood and asphaltum introduced into the bag; or both the bag and the musk are artificial, and only scented with real musk. The first of these adulterations is easily detected; the presence of blood may be suspected, if the musk, when held over the flame of a candle on a thin spatula, emits, as it inflames, a fetid smoke: and asphaltum is discovered by its melting, and running before it in flames, if heated on a spatula, whereas real musk inflames without running, and is converted into charcoal.[1] The artificial bags are known by the inner membrane, which lines the real musk bags being deficient.

Qualities.— The odour of musk is aromatic, but peculiar, extremely powerful and durable; the taste bitterish and heavy; and the colour a deep brown, with a shade of red. Exposed to heat it burns with a white flame, and leaves a light spongy charcoal. Trituration with potass developes ammonia. Boiling water dissolves it partially, alcohol better, and sulphuric ether still more completely. The watery *infusion* has a yellowish brown colour, a bitterish taste, and the strong odour of the musk; and reddens infusion of litmus. Solutions of muriate of mercury and of sulphate of iron produce with it copious precipitates; as does also infusion of yellow cinchona bark. Solution of nitrate of silver throws down a whitish precipitate, which, on exposure to the light, changes to a livid blue; and nitrate of mercury produces a brownish precipitate. The *alcoholic tincture* is of a reddish brown colour, transparent, but with scarcely any odour of the musk. Water renders it milky, and gives out the strong musk odour; but with the other tests it presents the same results as the watery infusion. The *ethereal tincture* has a deep brown colour; and, when evaporated on the surface of water, deposits a brown, tenacious, nearly insipid resin, and renders the water milky. The resinous matter has the musk odour in perfection; while the substance which occasions the turbidness of the water possesses the properties of extractive. From these results musk appears to contain albumen, gelatin, muriate of ammonia, phosphate of soda, and an uncombined acid; but the greater part of it consists of a resin combined with a volatile oil, and a mucilaginous extractive matter.

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[1] The formation of ammonia when rubbed with potass has also been mentioned as a test of the presence of blood; but the fixed alkalies have developed ammonia in the best specimens of musk we have ever seen.

Medical properties and uses.—Musk is stimulant and antispasmodic. Aëtius is the first writer who mentions it as a medicine; but it did not come into general use in this country till the beginning of the sixteenth century. It raises the pulse without much augmenting the heat of the body, and has a remarkable power of resolving spasm, and increasing the energy of the brain and nerves. Hence it is very efficaciously given in typhoid fevers, when low delirium, subsultus tendinum, and hiccough supervene; and in combination with ammonia to arrest the progress of gangrene. Its beneficial effects in all spasmodic diseases are well established; and Cullen says, he can vouch for its powers in retrocedent gout, which in many instances he had seen suddenly relieved by large doses of musk[1]. It checks the vomiting in cholera, at the same time that it allays the tormina of the intestines. In epilepsy we have seen more benefit derived from musk in combination with calomel than from any other remedy; and we are inclined to attribute much of the disappointment which others have experienced, either to the remedy not having been genuine, or the smallness of the dose. To obtain the full benefit of musk in this disease, the dose must be much larger than what is usually given; it should be repeated at shorter intervals, and its use longer continued. In an old confirmed case, in which three and four fits were experienced daily, musk, given to the extent of ʒſs four times a day, reduced the number of fits to one in three months. Upon the whole, we agree with Cullen "that musk is one of the most powerful antispasmodics we are acquainted with[1]," and regret that the high price of the drug necessarily limits very much its employment.[2]

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[1] *Mat. Med.* ii. 381.

As a local remedy, musk is said to be useful in atonic deafness when inserted into the ear with cotton; and it is recommended in the form of enema in the convulsions of children arising from the irritation of dentition.

Musk is best given in substance, in the form of bolus. The dose may be from grs. vj to ʒj, repeated at intervals of six or eight hours.

Officinal preparations. *Mistura Moschi.* L. *Tinctura Moschi.* D.

MYRISTICA. *Spec. Plant. Willd.* iv. 869.

Cl. 22. *Ord.* 13. Diœcia Monadelphia. *Nat. ord.* Lauri *Juss.*

G. 1851. *Male. Calyx* bell-shaped, trifid. *Corolla* 0. *Filament* columnar. *Anthers* six or ten united.

Female. Calyx bell-shaped, trifid, deciduous. *Corolla* 0. *Style* 0. *Stigma* two. *Drupe*, a nut involved in an arillus (*Mace*) with one seed.[3]

Species 1. M. *moschata.* The Nutmeg-tree. *Med. Bot. 2d ed.* 698. *t.* 238. *Rumphius. Herb. Amboin.* ii. *lib.* 11. *c.* 5. *t.* 4.

Officinal. MYRISTICÆ NUCLEI. *Lond.* MYRISTICÆ MOSCHATÆ NUCLEI, INVOLUCRUM *vulgo* MACIS. *Edin.* NUX MOSCHATA; OLEUM ESSENTIALE, OLEUM EXPRESSUM, INVOLUCRUM MACIS DICTUM. *Dub.* Nutmeg; Mace; Oil of Nutmeg, essential and expressed; Oil of Mace.

Syn. of the nutmeg. Noix muscade (*F.*) Moskatnuse (*G.*) Nosce moscata (*I.*) Nuez moscada (*S.*) Jaêphal (*H.*) Jatiphalo (*San.*) Pela (*Malay.*)—*Of the Mace.* Moshat blumen (*G.*) Macis (*I.*) Macias (*S.*) Jawatri (*H.*) Jatipatri (*San.*) Benga pela (*Malay.*)

The nutmeg-tree is a native of the Molucca islands. It has, however, been nearly extirpated from the greater number of them by the narrow policy of the Dutch, and is cultivated at Banda[4] only, where a sufficient quantity is reared to supply with mace and nutmegs the whole of Europe. It rises to the height of thirty feet, producing many erect branches, which, as well as the trunk, exude, when wounded, a red glutinous juice,

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[1] *Mat. Med.* l. c. 380.

[2] A mixture of musk and cinnabar in arrack is used by the Tonquinese as a remedy in hydrophobia. *Phil. Trans.* xlvi. 78. No benefit has been derived from its use in this disease in this country, although it has been fairly tried.

[3] In our description, we have followed Gærtner, who denominates the fruit "Bacca monosperma;" although, in our translation of the Generic character by Willdenow, we have not altered the term "Drupa."

[4] This term includes six smaller islands, Neyra, Lenteira, Pulo-Aya, Goenenga, Apia, Pelerona, and Rossengenia; but the three first only bear nutmeg-trees.

and are covered with a smooth ash-coloured exterior bark. The leaves, which stand alternately on short petioles, are elliptical, pointed, undulated, entire, and obliquely nerved; of a bright green colour on the upper surfaçe and grayish underneath, with an aromatic taste. The flowers are present at the same time with the fruit, inodorous, small, supported on axillary peduncles; and male and female on the same, and separate trees: the calyx in both is fleshy, smooth, and divided at the edge into three moderately spreading segments. There are no corollas. The filaments in the male flowers are short, united into one columnar bundle, inserted into the receptacle, and bear each a linear anther which surrounds the upper half of the filament. The germ in the female is superior, oval, and crowned with a style terminated by two stigmas. The fruit is an elliptico-spheroidal, one-celled, superior berry, marked with a shallow longitudinal groove on one side, fleshy, smooth, one-celled, and the size of a small peach; the flesh is thick, rather solid, and finally dries up to a coriaceous crust, which opens at one side, and displays the nutmeg in its shell covered with an arillus, which is the officinal *mace*, and by it fixed to the bottom of the cell. This is a fleshy, coriaceous, saffron, or yellow-coloured substance, divided deeply into many slips, which closely invest the shell of the nutmeg. The kernel, which is the proper nutmeg, is of a roundish oval form, marked on the outside with many vermicular furrows, within, of a fleshy-farinaceous substance; variegated whitish and bay, and having a cavity at the bottom for the embryo.[1]

The nutmeg-tree yields three crops annually: the first in April, which is the best; the second in August, and the third in December, yet the fruit requires nine months to ripen it. When it is gathered, the outer coriaceous covering is first stripped off, and then the mace carefully separated and dried in the sun. The nutmegs in the shell are next exposed to heat and smoke for three months, then broken, and the kernels thrown into a strong mixture of lime and water, after which they are cleaned and packed up. This process is necessary for their preservation, and with the same intention the mace is sprinkled with salt water. There are several varieties of the tree; but that denominated the Queen nutmeg, which bears a small round nut, is the best. They are imported in chests which contain each from 100 to 140lbs. weight; the mace comes in chests also of different sizes: the essential oil, which is obtained in Banda by the distillation of the nuts, is brought in bottles; and the expressed oil in stone jars.

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[1] *Gærtner de Fructibus*, t. 41.

Qualities.—The nutmeg has a fragrant agreeable spicy odour, and a warm aromatic taste. It is easily cut with a knife, but not very pulverulent. When cut transversely, and examined by the microscope, the dark coloured veins which run through its substance appear to consist of cellular matter filled with oil, which is the active matter of the nutmeg. Alcohol and ether extract completely the active qualities of nutmeg. When the ethereal tincture, which is limpid, and of a golden yellow colour, is evaporated on water, a small portion of volatile essential oil unites with the water, and a white opaque granular sebaceous substance, heavier than water, which has much the appearance of the expressed oil, is deposited. When alcohol is digested on this substance, it dissolves very little of it, but becomes yellow, and acquires the qualities of a spirituous solution of the essential oil; the undissolved substance, if washed in water, is nearly insipid, melts at a temperature of 150°, and, on cooling, concretes into a translucent brittle cake which has the properties of wax. The part of the nutmeg insoluble in ether is chiefly gum and starch. In distillation with water, nutmegs yield $\frac{1}{32}$ of their weight of essential volatile oil, and by expression one-third of a sebaceous fixed oil.[1] Hence, the components of the nutmeg seem to be starch, gum, volatile oil, wax, and a fixed fat oil. The *volatile oil* possesses the odour and taste of the nutmeg in a concentrated degree, is of a pale straw colour, limpid, transparent, and lighter than water. The *expressed oil*, which is erroneously called *oil of mace*, when first drawn, is limpid and yellow, but on cooling acquires the consistence of spermaceti and somewhat of the appearance of Castile soap, being whitish, mottled with reddish brown. Its odour is agreeable and slightly aromatic, and its taste fatty, pungent, and bitterish. It appears to be a vegetable cerate, or a triple compound of fixed oil, volatile oil, and wax. Besides the genuine expressed oil, there are two other sorts found in the shops; one, which is said to come from Holland, of a paler colour, and in flat square cakes; and another, which is an artificial composition of suet, palm oil, and spermaceti scented with a little volatile oil of nutmeg. *Mace* resembles the nutmeg in its odour and taste, but is more pungent and bitter. It is in laciniated, flexible, thin pieces, unctuous to the feel, and of a deep reddish yellow colour. Alcohol and ether extract its active principles; and when the ethereal tincture is evaporated on water, a thick deep yellow coloured, very pungent, and odorous oil is left in drops on the surface of the water, with some resin; and a small portion of extractive is deposited, but no waxy granular matter.

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[1] *Neuman's Chemistry*, 404.

Medical properties and uses.[1]— As the medical properties of nutmeg and mace depend on the essential oil they contain, they agree in these circumstances; and both are stimulant, carminative, and in large doses narcotic. Mace is more generally used as a culinary spice; but the nutmeg and its volatile oil are in frequent use to cover the disagreeable taste of other medicines; and are sometimes ordered in cases of languors, vomiting and diarrhœa, and in flatulent colic. On account of the narcotic property of the oil, nutmeg should be cautiously employed in apoplectic and paralytic habits. In India its dangerous effects have been frequently felt[2]; and in this country instances have occurred in which the nutmeg, taken in large quantity, produced drowsiness, great stupor, and insensibility; and, on awakening, delirium which alternated with sleep for several hours.[3] The volatile oil is sometimes used as an external stimulant, and the expressed oil is seldom employed for any other purpose. The dose of the nutmeg and the mace is from grs. v. to ℈j; that of the volatile oil, ♏ij, to ♏vj.

Officinal preparation. *Spiritus Myristicæ.* L. E. D.

MYROXYLON. *Spec. Plant. Willd.* ii. 546.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Lomentaceæ *Linn.* Leguminosæ *Juss.*

G. 829. *Calyx* bell-shaped, five-toothed. *Petals* five, the upper one larger than the others. *Germen* longer than the corolla. *Legume* with one seed only at the point.

Species 1. M. *peruiferum* Sweet-smelling Balsam-tree. *Hernandez Nova Plant. &c. Mexican. Hist. fol.* 51. *cum figura.*

Officinal. MYROXYLI PERNIFERI BALSAMUM. *Edin.* Peruvian Balsam.

Syn. Baume de Perou (*F.*) Peruvianischer Balsam (*G.*) Balsamo del Peru (*I.*) Balsamo de Quinquica (*S.*)

The Peruvian balsam tree is a native of the warmest provinces of the continent of South America.[4] It is a very beautiful tree, with a smooth thick bark, which is very resinous, as is every part of the tree. The leaves are alternate and abruptly pinnate. The leaflets in two pairs, nearly opposite, petiolate, ovato-lanceolate, with the apex lengthened, blunt, emarginate, entire, veined, and very smooth. The midrib, which runs through the whole length of the under surface of the leaf, is raised and pubescent; the common petiole is round and pubescent. The flowers are scattered, on axillary erect racemes, longer than the leaves. The peduncles are roundish and pubescent; each supported by a small, erect, ovate, concave bracte, appearing to the naked eye like a tubercle. Pedicels erect. The calyx is bell-shaped, hoary green, and surrounded by the petals and anthers, which are white, and containing within, a green legume that has a singular appearance in the flower. The substance of the leaves is full of translucent, linear, points, like the leaf of the orange-tree.

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[1] Avicenna first noticed nutmegs as a medicine.

[2] *Bontius de Medicina Indorum.* 20.

[3] Cullen, *Mat. Med.* ii. 204.

[4] Mutis discovered it, and sent a branch of the tree to the younger Linnæus about the year 1781.

This tree yields by incisions made early in the spring, a liquid balsam, which is collected in bottles. What is found in the shops is obtained by boiling the twigs in water. It is imported in jars, each containing from twenty to forty pounds weight. A mixture of resin and some volatile oil with benzoin is often sold for Peruvian balsam, and the fraud is not easily detected.

Qualities.— The balsam which we receive has a fragrant aromatic odour, much resembling that of benzoin, with a warm bitterish taste, leaving a slight sensation of burning in the throat after it is swallowed, with some degree of sweetness. It is viscid, of a deep reddish brown colour, and of the consistence of fluid honey. Water boiled on the balsam becomes acidulated, and deposits on cooling crystals of benzoic acid. In distillation with water, a small portion of a volatile limpid oil is obtained, and benzoic acid sublimes in the neck of the retort. Its remaining matter is a resin. Ether in small quantity dissolves it readily and completely; alcohol also dissolves it, but the quantity of menstruum must be considerable. Sulphuric acid converts it into artificial tannin and charcoal. Treated with nitric acid, some prussic acid is evolved, benzoic acid sublimes, and the residual matter is artificial tannin.[1] The alkalies and their carbonates form with it thick masses, which, on the addition of sulphuric acid lets fall a resinous matter, and benzoic acid crystallizes. Hence Peruvian balsam appears to consist chiefly of a resin, volatile oil, and benzoic acid.

Medical properties and uses.— Balsam of Peru is stimulant and tonic. It has been regarded as expectorant also, and recommended in catarrh and other pulmonary affections; but it is contra-indicated wherever any inflammatory action is present; and to its stimulant operation on the pulmonary exhalants we may ascribe its use in chronic asthma and old obstinate coughs.[2] In gleets, leucorrhœa, palsy and chronic rheumatism, its tonic powers have proved beneficial; as well as in many other cases of debility. It may be given to the extent of fʒj for a dose. As a local stimulant it is employed externally with great advantage for cleansing and stimulating foul and indolent ulcers; and a mixture composed of ʒj of the balsam and ʒiij of ox gall I have found extremely useful when dropped into the ear every day, after syringing with a solution of soap, in fœtid discharges of the ear.

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[1] Hatchet. *Phil. Trans.* 1806. *Thomson's Chemistry*, iv. ed. v. 126.

[2] Sydenham gave it in phthisis.

MYRRHA.[1] *Lond. Edin.* MYRRHA; GUMMI-RESINA. *Dub.* Myrrh, a gum-resin.

Syn. Myrrhe (*F.*) Myrrhen (*G.*) Mirra (*I.*) Mirra (*S.*) Murr (*Arab.*) Ból (*H.*) Bóla (*San.*)

The tree or plant which produces this gum-resin is a native of the eastern coast of Arabia Felix, and of Abyssinia, growing, according to Mr. Bruce's account, behind Azab, along the coast towards the straits of Babelmandel. It is undescribed by naturalists; and the conjectures of Mr. Bruce in favour of its being a Mimosa are by no means satisfactory.[2] The appearance of the best myrrh, as we receive it, affords reasons for supposing that it is an exudation from the plant. It is imported in chests each containing from one to two hundred weight The Abyssinian myrrh comes to us through the East Indies, while that produced in Arabia is brought by the way of Turkey.

Qualities. — Myrrh has a peculiar, rather fragrant odour, and bitter, aromatic taste. It softens in the mouth, adheres to the teeth when chewed, and is in small irregularly shaped pieces, which can scarcely be called tears; they are translucent, of a reddish yellow colour, brittle, breaking with a resinous fracture, and easily pulverized. It does not melt when heated, and is not very inflammable. Its specific gravity is 1·360.[3] Such are the characters of good myrrh; but it is often opaque mixed with many impurities, and either white or of a dark colour approaching nearly to black, with a disagreeable odour, in which case it should be rejected.

Myrrh is partially soluble in water, alcohol, and ether. In distillation with water, it yields an oil heavier than water. When it is triturated with very soft or distilled water, nearly the whole appears to be dissolved, forming an opaque yellowish solution; but the greater part is deposited by rest, and not more than one-third of the gum-resin is actually dissolved. The alcoholic tincture is rendered milky and opaque when mixed with water, but no precipitate appears. Braconnot asserts, that 100 parts of myrrh consist of 23 resin and 77 gum[4], but my experiments lead to a somewhat different conclusion, and accord more with those of Pelletier, who found the proportions to be, 34·68 of resin and 66·32 of gum. Ether digested on powdered myrrh dissolved three parts in eight, and the tincture evaporated on water deposited two grains and a half of very bitter resin, and half a grain of extracttive matter, which also tasted bitter. The part insoluble in the ether was nearly all soluble in water, and afforded a solution resembling that of acacia gum; but differed from it in being precipitated by solutions of muriate of mercury and of superacetate of lead. When treated with nitric acid it yields oxalic acid. Hence myrrh seems to consist of resin, essential oil, extractive, and mucus rather than gum.

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[1] Σμυρνα Dioscoridis. The name Μυῤῥα, used by Hippocrates, is derived from μυρον, an ointment.

[2] *Phil. Trans.* lxv. 413.

[3] Brisson.

[4] *Annales de Chimie*, lxviii. 52.

Medical properties and uses. — Myrrh is tonic and expectorant. In moderate doses it stimulates the stomach, promoting the appetite and digestion; but in large doses, increases the frequency of the pulse, and augments the general heat of the body.[1] As a tonic, it is efficaciously given in cases of debility, as amenorrhœa, chlorosis, and convalescencies; and in phthisis pulmonalis, when the inflammatory symptoms and hectic fever do not run high. Its use in phthisis has indeed been condemned by several physicians of great repute[2]; but when there is an evident ulceration of the lungs without much hectic, and the patient's strength is considerably reduced by the quantity of the expectorated matter, the proper exhibition of myrrh is certainly productive of much benefit. In the first-mentioned diseases, it is advantageously combined with aloes, cinchóna, or other bitters, and chalybeates; and in phthisis, with nitre, digitalis, opium, camphor, and the sulphate of iron or of zinc. Combined with oxide of zinc it has been found extremely useful in the peculiar cough which sometimes accompanies pregnancy, and continues after abortion. As an expectorant it is often employed in humoral asthma and chronic catarrh; and with the same view also has been given in phthsical affections; but as it cannot be employed with propriety in pulmonic cases, where there is much inflammatory action or hectic present, any advantage derived from its use in phthisis probably depends altogether on its tonic operation counteracting the exhaustion produced by a copious purulent expectoration. As a local stimulant the alcoholic solution of myrrh diffused in water is used as a lotion in a spongy state of the gums, and for correcting the fœtid discharge of vitiated ulcers, particularly when connected with caries of the bone; and as a gargle in cynanche maligna.

Myrrh is administered in substance, or in the form of watery infusion, or a tincture properly diluted. A watery extract is ordered in some foreign pharmacopœias, and preferred by many physicians, from an idea that it is less heating than the gum resin; but it is equally bitter, and is perhaps not different from a diminished dose of the myrrh.

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[1] Cullen, *Mat. Med.* ii. 193.

[2] Cullen. Fothergill.

Officinal preparations. *Tinctura Myrrhæ* L. E. D. *Tinctura Aloes et Myrrhæ.* E. *Pilulæ Aloes cum Myrrha.* L. E. D. *Pilula Ferri cum Myrrha.* L.

MYRTUS. *Spec. Plant. Willd.* ii. 967.

Cl. 12. *Ord.* 1. Icosandria Monogynia *Nat. ord.* Hesperideæ *Linn.* Myrti *Juss.*

G. 973. *Calyx* five-cleft, superior. *Petals* five. *Berry* two or three-celled, many seeded.

Species 28. Myrtus *Pimenta.* Pimenta, or All-spice tree. *Med. Bot.* 2*d. ed.* 541. *t.* 194.

Officinal. PIMENTÆ BACCÆ. *Lond.* MYRTÆ PIMENTÆ FRUCTUS *Edin.* PIMENTO; (*Piper Jamaicense*) BACCÆ. *Dub.* Pimenta Berries. Jamaica Pepper.

Syn. Poivre de Jamaique (*F.*) Nelhenpfeffer (*G.*) Pimenti (*I.*) Pimienta (*S.*)

This tree is a native of South America and the West India islands. It grows in great plenty on the hilly parts, on the north side of the island of Jamaica; flowering in June, July, and August, and soon afterwards ripening its fruit. It is a handsome tree, rising in height about thirty feet, straight, branching, and covered with a very smooth gray bark. The leaves, which are supported on footstalks at the ends of the twigs, are elliptical, pointed, of different sizes, but the largest five inches long, and two broad in the middle, smooth, thin, entire, shining, and of a deep green colour; the flowers are produced in terminal bunches, or rather trichotomous panicles: the calyx is four-cleft; the petals four, reflected, of a pale green colour, inclosing many longer spreading filaments of the same colour, supporting pale yellow roundish anthers: the fruit is a spherical berry, crowned with the persistent calyx; when ripe black, or dark purple, smooth, shining, and bilocular, with the seeds enveloped in a moist, green, pungent, aromatic pulp.[1]

The fruit, which is the part of this plant medicinally used, is gathered before it is ripe[2], and exposed to the sun for many days, spread thin upon cloths. They require to be frequently turned, and carefully preserved from the dews. By degrees, under this management, they become wrinkled, and change from green to a brown colour; after which they are packed in bags and hogsheads for the European market. The more fragrant and smaller they are, the better they are accounted.[3]

Qualities.—Pimenta has an aromatic, agreeable odour, resembling that of a mixture of cinnamon, cloves, and nutmegs, with the warm pungent taste of the cloves; qualities which reside chiefly in the cortical part of the dried berry. Water, alcohol, and ether extract its virtues. The watery infusion is of a brown colour, and reddens litmus infusion. With solution of sulphate of iron it immediately strikes a deep black colour, and slowly lets fall a precipitate. Nitrate of mercury precipitates it of a yellowish brown; superacetate of lead of a dirty green; and nitrate of silver of a deep reddish brown colour. It is also precipitated by infusion of yellow cinchona bark. The sulphuric and muriatic acids redden it, and throw down pale rose-coloured precipitates. The nitric acid forms no precipitate, but gives it a yellow hue. The alcoholic tincture is rendered milky, and slowly precipitated by water: the ethereal, when evaporated on water, deposits drops of a greenish yellow volatile oil, a pellicle of a pungent nauseous tasted resin, and some extractive. Hence pimenta appears to contain a volatile oil, resin, extractive, tannin and gallic acid.

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[1] Sloane, *Phil. Trans.* xvii. 462.

[2] When the berries ripen, they lose much of the aromatic warmth for which they are esteemed, and acquire a taste similar to that of juniper berries.

[3] Sloane, l. c.

Medical properties and uses. — Pimenta is stimulant and tonic. It is useful as an adjunct to bitters in dyspepsia attended with much flatulence, and in arthritic and hysterical affections. The watery infusion of it sweetened with sugar, and with the addition of a little milk, is very readily taken by children; and is an excellent cordial in malignant measles, scarlatina, confluent small-pox, and the other exanthemata, when the fever assumes the typhoid type. But the principal use of pimenta in medicine is to cover the disagreeable taste of other remedies, or to give them warmth. The dose of the berries is from gr. v. to ℈ij in powder, or swallowed in their entire state.

Officinal preparations. *Aqua Pimentæ.* L. E. D. *Oleum Pimentæ.* L. E. D.

NICOTIANA. *Spec. Plant. Willd.* i. 1014.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. Ord.* Luridæ *Linn.* Solaneæ *Juss.*

G. 379. *Corolla* funnel-shaped with the border plaited. *Stamens* inclined. *Capsules* two-valved, two-celled.

Sp. 1. N. *Tabacum.*[1] Tobacco. *Med. Bot. 2d ed.* 208. *t.* 77.

Officinal. TABACI FOLIA. *Lond.* NICOTIANÆ TABACI FOLIA. *Edin.* NICOTIANÆ FOLIA. *Dub.* Tobacco leaves.

Syn. Tabac (*F.*) Taback (*G.*) Tabacco (*I.*) Tobaco (*S.*) Bujjirbhang (*Arab.*) Tambácu (*H.*) Támracuta (*San.*)

Tobacco is an annual plant, a native of America, and par-

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[1] This plant was first discovered by the Spaniards in Yucatan in 1520, and was there called *petun* or *petum*. It was afterwards transported to the West Indies and North America; and brought to Europe by Hernandez de Toledo, who came from Florida to Portugal in the beginning of the 16th century. The seeds were sent from Portugal to Catherine de Medicis by Jean Nicot, an agent of Francis II., after whom it received its generic name Nicotiana: the specific appellation being taken either from *tabac*, the name of an instrument used by the natives of America in the preparation of the herb; or *Tabaco*, the name of a Mexican province.

tially cultivated in Europe; flowering in July and August. The root is large and fibrous, and sends up an erect branching stem about four feet in height, round, villous, slightly viscid, and furnished with numerous large, alternate, entire, pointed leaves, the lowermost of which are about two feet long, and four inches broad; they are sessile, a little decurrent, with a strong midrib, and of a pale green colour on the upper surface, and still paler underneath. The flowers are in large terminal panicles, with long linear pointed bractes at the base of each division: the calyx is bell-shaped, obscurely pentangular, villous, slightly viscid, and cleft into five acute erect segments; the corolla is very viscid, its tube twice the length of the calyx, of a pallid greenish hue, and swelling into an oblong cup, which expands into five-pointed, plaited, pale red or rose-coloured segments: the stamens are the length of the tube of the corolla, and support awl-shaped, compressed, oblong anthers: the style, which is the length of the corolla, and crowned with a capitate slightly cleft stigma, rises from a conical germen, that changes to an ovate capsule containing many reniform small seeds, and opening at the apex.

Tobacco was at one period raised to a considerable extent in Yorkshire[1]; but the cultivation of it for the purposes of trade has been long prohibited; and this country, as well as the greater part of Europe, is chiefly supplied from Virginia, where the plant is cultivated in the greatest abundance. There are two varieties of this species, known by the name of Virginian tobacco, a broad and a narrow leaved sort; but they do not differ in their medical properties. In Virginia the plant is not allowed to attain its full height, but is topped whenever a certain number of leaves is thrown out. It is cut down in August, and the plants hung up in pairs in sheds to dry, after which the leaves are separated from the stem, bound up in bundles, and packed in the hogsheads in which they are exported.

Qualities. — The recent leaves possess very little odour or taste; but when dried their odour is strong, narcotic, and somewhat fœtid; their taste bitter, and extremely acrid. When well cured, their colour is yellowish green. They emit sparks in burning, and give out a suffocating smoke; and when distilled, yield an essential oil of a green colour, on which their medicinal properties are supposed to depend, and which is said to be a very virulent poison.[2] This oil is dissipated by the long coction of tobacco with water; yet in distillation with ether, water, or alcohol, no oil comes over. By infusion, however, it yields its active principles to both these fluids. Its deflagration shows the presence of nitrate of potash; and Bouillon la Grange discovered muriate of potash in its inspissated juice.[1] According to Vauquelin, tobacco appears to contain albumen or gluten, supermuriate of lime, acetic acid, nitrate and muriate of potash, muriate of ammonia, a red matter, soluble in alcohol and water, a green fecula, and a peculiar substance, on which the properties of the plant appear to depend, and which has been therefore named *nicotin.*[2]

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[1] It was first cultivated in England in 1570, according to Lobel's account.

[2] The poisonous effects of this oil are very powerful: Mr. Barrow, speaking of the use which the Hottentots make of tobacco oil for destroying snakes, says, "A Hottentot applied some of it from the short end of his wooden tobacco-pipe to the mouth of a snake, while darting out his tongue. The effect was instantaneous as an electric

Medical properties and uses. — Tobacco is narcotic, sedative, emetic, diuretic, cathartic, and errhine, whether it be taken into the stomach, or externally applied. The three first mentioned properties are sufficiently obvious, even from the effects which smoking or chewing it produce on persons unaccustomed to its use.[3] These are, very severe sickness, headach, extreme debility, cold sweats, and sometimes, even convulsions. The production of such a state of the habit, however, being useful for relieving violent spasmodic constriction, tobacco is advantageously employed in obstinate constipation, ileus, suppression of urine, and incarcerated hernia, when other remedies fail of affording relief. The smoke is either thrown into the rectum by means of a pair of bellows of a peculiar construction, or an infusion of the leaves is exhibited in the form of enema.[4] From its narcotic power also, the smoking or chewing tobacco has been found useful in allaying the pain of toothach; and smoking it has been recommended, and in some instances found useful in shortening, and rendering

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shock: with a convulsive motion that was momentary, the snake half untwisted itself, and never stirred more; and the muscles were so contracted, that the whole animal felt hard and rigid, as if dried in the sun." *Travels in Africa*, p. 268.

[1] *Journal de Physique*, xxxix. 193.

[2] This substance is colourless, acrid, has the odour of tobacco, and like it occasions violent sneezing. It is volatile, poisonous, and produces colourless solutions with alcohol and water, from which it is thrown down by tincture of nut-galls. Vauquelin regards it as approaching the volatile oils in its properties. Vide *Ann. de Chimie.* tome lxxi. p. 139.

[3] The custom of smoking tobacco was introduced into England by Sir Walter Raleigh; and was at one time extremely prevalent, but is now confined chiefly to the lower class of the people. In some parts of Europe, however, it is still regarded as the greatest solace and pleasure of the luxurious. It is a curious fact, that in England an edict was published against its use; that Urban the viiith anathematised those who used it in churches; and in Constantinople, where its use is now so general, the custom was in the beginning of the 17th century thought so ridiculous and hurtful, that a Turk found smoking was conducted in ridicule through the streets with a pipe transfixed through his nose.

[4] The native doctors in India apply the leaves to the orifice of the anus. Vide *Ainslie's Mat. Med. of Hindostan,* 4to. p. 48.

more supportable the paroxysm of spasmodic asthma. The infusion has been used as an emetic; but the practice cannot be recommended: and notwithstanding the success of Dr. Fowler[1], who employed it in dropsy and dysury; its general effects are too violent for internal exhibition, and it is not equal as a diuretic either to squill or foxglove, which are more manageable remedies. In dysury, however, as Dr. Pearson has observed, its antispasmodic properties are of advantage, and consequently its use in that complaint is less objectionable.[2] The external application of a strong infusion of tobacco, or of a cataplasm of the moistened leaves themselves, is sometimes employed as a local stimulant in porrigo, scabies, and some other cutaneous eruptions; but even in this mode of using it, tobacco is apt to induce the same virulent effects as when it is internally administered in large doses.

But tobacco is chiefly employed as a sternutatory, and is the basis of all the kinds of snuff generally used. The powdered leaves, when snuffed up the nostrils of those unaccustomed to the use of snuff, excites vehement sneezing, and promotes a considerable discharge from the nostrils, answering all the purposes for which errhines are employed. As a luxury snuff has been used upwards of two hundred years in Britain, and has been taken in great quantities without any perceptible bad consequence; although it has been asserted that its immoderate use weakens the sight, produces lethargy, and gives a tendency to apoplexy. After the use of it has become habitual, it cannot be relinquished without considerable risk, arising from the suspension of the artificial discharge it produces, as Dr. Cullen observed from his own experience.[3]

The London College has given a formula for an infusion proper to be used as an enema; as a diuretic, that employed by Dr. Fowler is made with ℥j of the dried leaves, and Oj of boiling water, and given in doses of ♏lx to ♏lxxx, twice a day.

Officinal preparations. *Infusum Tabaci.* L. *Vinum Nicotianæ Tabaci.* E.

OLEA. *Spec. Plant. Willd.* i. 44.

Cl. 2. *Ord.* 1. Diandria Monogynia. *Nat. ord.* Sepiariæ *Linn.* Jasmineæ *Juss.*

G. 36. *Corolla* four-cleft, with subovate segments. *Drupe* one-seeded.

Species 1. O. *Europæa.*[4] European Olive. *Med. Bot. 2d. ed.* 280. *t.* 93. *Sibthorp Flora Græca, t.* 3.

Officinal. OLIVÆ OLEUM. *Lond.* OLEÆ EUROPŒÆ OLEUM FIXUM. *Edin.* OLEUM OLIVARUM. *Dub.* The oil of the olive.

Syn. Huile d'Olive (*F.*) Olivenöhl (*G.*) Olio d'Ulive (*I.*) Azeite (*S.*)

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[1] *Med. Reports on the Effects of Tobacco, &c.*

[2] *Practical Synopsis, &c.* 228.

[3] *Materia Medica,* ii. 437.

[4] Ελαια αγρια Dioscoridis.

The olive tree is a native of the south of Europe and the north of Africa; but is cultivated in great abundance in France, Spain, and Italy. It has been cultivated in the open air in England, but its fruit has never been ripened.[1] It grows upon the most rocky soil, seldom exceeds twenty feet in height; and has a solid, upright stem, covered with a gray bark, and very branching: the leaves are evergreen, opposite, spreading, nearly sessile, stiff, lanceolate, from two to three inches long, and half an inch broad in the middle, with the margin a little turned back; of a full green colour, smooth and even on the upper surface, and white or hoary below. The flowers are in opposite axillary clusters, half the length of the leaves, on short flower stalks, with small, concave, obtuse, hoary bractes: the calyx is deciduous, four-cleft, and regular: the corolla white, four-parted, regular, spreading, with ovate, obtuse, obscurely three-nerved segments; the stamens are shorter than the corolla, divaricated, supporting large pale yellow elliptical anthers: the stigma bipartite on an erect style, rising from a roundish superior germen: the fruit is a smooth, oval plum or *drupe*, about three-fourths of an inch in length, and half an inch in diameter; of a deep violet colour when ripe, whitish and fleshy within, bitter and nauseous, but replete with a bland oil[2]; and covering an osseous, oblong, pointed, rough nut.

There are several varieties of the olive tree, of which the variety γ or *longifolia* of Willdenow is most esteemed, as affording the best oil. The mode of obtaining the oil from the ripe fruit was known very early in Egypt; and it is chiefly for this purpose that the tree is now cultivated in Spain, Provence, and Italy. To procure the oil, the ripe fruit is gathered in November, and immediately bruised in a mill, the stones of which are set so wide as not to crush the nut. The pulp is then subjected to the press in bags made of rushes, and by means of a gentle pressure the best oil, which is called virgin oil, flows first: a second sort is got by breaking the marc, moistening it with warm water, and returning it to the press; and lastly, a very inferior kind is obtained, either by boiling the magma, or by breaking, moistening, and fermenting it in large cisterns, and again submitting it to the full force of the press. When the olive is not sufficiently ripe, the recent oil has a bitterish taste, and when too ripe is fatty. After the oil is drawn, it deposits by standing a white fibrous albuminous matter; from this the clear oil is poured off, and a second deposition takes place; after which, if put into clean glass flasks, there is no further alteration.

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[1] *Miller's Gardener's Dictionary*, ed. 1797. Art. *Olea.*

[2] The unripe fruit, when pickled in a strong solution of common salt, is a well-known luxury of the table.

The best oil is made in Provence; its excellence arising from the olives being carefully cleaned and garbled; but what we receive in this country comes from Lucca and Florence. Sicily also furnishes some; but it has a resinous flavour[1]; and good oil has lately been brought from Samos. It is imported in jars, half-jars, and what are called half-chests, which are wooden packages containing flasks.

Qualities. — Pure olive oil is an insipid, inodorous, pale greenish yellow-coloured, viscid fluid; unctuous to the feel; inflammable, incapable of combining with water, and nearly insoluble in alcohol. It is fixed in any temperature under 600°, suffering considerable expansion, but not evaporating; and congeals at 38° of Fahrenheit. It is the lightest of the fixed oils; its specific gravity being 0·9153. When kept for a great length of time, or much exposed to the air, its components[2] are partially separated, the sebacic acid and water are formed, and the oil acquires a disagreeable smell and sharp taste, becomes thick, brown-coloured, and is then said to be rancid. The rancidity is hastened by heat, and by the admixture of poppy oil, with which it is often adulterated.

Medical properties and uses. — Olive oil is demulcent, relaxant, and laxative. It is used internally as a demulcent in catarrh and other pulmonary affections, diffused in water by means of mucilage; and is also given internally, in large quantities, to mitigate the action of acrid substances, as some poisons, taken into the stomach; and in cases of worms. Externally applied it is a very useful relaxant, and instead of stopping up the cutaneous exhalants, appears to promote the excretion of sweat; on which account it has been employed with great advantages in frictions in the commencement of plague. The body is ordered to be very briskly rubbed all over with a clean sponge dipped in warm olive oil: copious perspiration generally follows, and the operation must be repeated once a day until symptoms of recovery appear. Mr. Jackson relates, that the Coolies who are employed in the oil stores at Tunis smear themselves all over with oil, and are seldom afflicted with the plague when it rages in that city[3]; an effect which may be owing to the oil forming a coating to the skin, so that it cannot come directly in contact with the contagion. Frictions with it are useful in ascites. It is also used as an injection in gonorrhœa; as an adjunct to glysters in dysentery, and intestinal abrasions, and extensively in pharmacy, in the composition of ointments, cerates, and plasters.

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[1] This flavour has been ascribed to the Sicilian olives being grown on dry hilly situations. *Galt's Letters from the Levant*, 8vo. p. 129.

[2] Vide *Expressed Oils.*

[3] *Reflections on the Commerce of the Mediterranean*, p. 64.

[4] Lord Bacon, speaking of Inunction, says, — "Ante omnia igitur usum olei vel

The dose of olive oil is from fʒj to f℥j, triturated with mucilage, or mixed with water by means of a few drops of solution of potash. In cases of poisons or of worms, as much may be given as the stomach can bear.

ONISCUS. *Syst. Nat. Gmelin.* v. 3009.

Cl. 5. *Ord.* 7. Insecta Aptera.

G. 272. *Jaw* truncated, toothed. *Lip* bifid. *Palpi* unequal. *Feelers* bristly. *Body* oval. *Feet* fourteen.

Sp. 14. O. *asellus.*[1] Slaters.

Officinal. MILLEPEDÆ; SPIRITUS VINI VAPORE ENECATÆ. *Dub.* Slaters killed by the vapour of spirit of wine.

Syn. Cloporte (*F.*) Kellerwürmer (*G.*)

These insects are found on roofs of houses, old walls, and under stones; they are rather more than half an inch in length, whitish on the belly, with seven pairs of legs, each terminated by a sharp horny claw. The head is somewhat pyramidal, and furnished with two articulated feelers; and the whole of the animal on the upper part is guarded by a callous brownish livid-coloured jointed armour, consisting of fourteen semicircular scales, within which the insect rolls itself like a ball when touched. Like some other insects it casts the skin, and carries the young in valvular follicles under the abdomen. Slaters are prepared by hanging them inclosed in a canvas bag, in the steam of hot alcohol, till they are killed.

Qualities. — Prepared slaters have a fetid odour, and a sweetish nauseous taste; on analysis they furnish an alkalescent fluid and an inert oil.

Medical properties and uses. — These insects were formerly regarded as expectorant, and diuretic; and used in humoral asthma,, dropsy, jaundice, and a long list of diseases. The retention of them in the list of materia medica exhibits the remains of a barbarous practice, which the good sense of modern practitioners should altogether explode. Their value as a medicine was justly estimated by professor Alston, when he observed, "Upon the whole there is reason to think Millepedarum ℈j is good for nothing; and ℥ſs not much worth."[2]

OPIUM. See *Papaver.*

OPOPONAX. See *Pastinaca.*

ORIGANUM. *Spec. Plant. Wild.* iii. 132.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. Ord.* Verticillatæ *Linn.* Labiatæ *Juss.*

G. 1116. *Strobile* four-cornered, spiked, collecting the calyces. *Co-*

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olivarum vel amygdali dulcis, ad cutem ab extra unguendum, ad longævitatem conducere existimamus." *Opera*, fol. 1665. p. 536.

[1] 'Ονισκοι Discoridis.

[2] *Lectures on Mat. Med.* ii. 496.

rolla with the upper lip erect and flat, the under three-parted, with the segments equal.

Species 10. O. *vulgare.*[1] Common Marjoram. *Med. Bot. 2d. ed.* 344. *t.* 123. *Smith Flor. Brit.* 639. *Engl. Bot.* 1143.

Species 15. O. *Majorana.* Sweet Marjoram. *Med. Bot. 2d edit.* 345. *t.* 124.

1. ORIGANUM VULGARE.

Officinal. ORIGANUM. *Lond.* Common Marjoram leaves.

Syn. Oriang (*F.*) Dort, Wohlgemuth (*G.*) Origàno (*I.*) Origano Sylvestre (*S.*)

This plant is indigenous and perennial, growing on dry chalky and gravelly hills, flowering from July to September. The root is creeping and fibrous, sending up erect, branching, trichotomous, tetragonous stems, about eighteen inches in height, downy, and of a purplish hue. The leaves are ovate, entire, somewhat hairy, ciliated, punctured, and of a deep yellowish green colour. The flowers are in terminal panicles, of a pink-purple or rose colour, and furnished with ovate, sessile, brownish-red bractes. The calyx is tubular, toothed; the segments being nearly equal: the corolla is funnel-shaped, with the upper lip bifid and obtuse, and the under trifid, blunt, and spreading. The filaments are furnished with double anthers, and the style is filiform, with a bifid reflected stigma.

Qualities. — The odour is agreeable and aromatic, and the taste warm and pungent, much resembling thyme. In distillation with water it affords a very acrid penetrating volatile oil, on which its qualities depend.

Medical properties and uses. — Common marjoram is regarded as tonic, stomachic, and emmenagogue. It was formerly used in debilities of the stomach; but is now neglected. The dose is from grs. x. to ℈j, in powder.

Officinal preparation. *Oleum Origani.* L.

2. ORIGANUM MAJORANA.[2]

Officinal. ORIGANI MARJORANÆ HERBA. *Edin.* MAJORANA; HERBA. *Dub.* Sweet Marjoram.

Syn. Marjolaine (*F.*) Majoran (*G.*) Maggiorana (*I.*) Origano (*S.*)

This is an annual plant, a native of Portugal and Syria; but cultivated in our gardens for culinary and medicinal purposes, and flowering in July and August. The root is long, brown, and fibrous; the stems numerous, woody, branching, and rising a foot and a half in height. The leaves are downy, entire, ovate, petiolate, and of a pale green colour. The flowers are small, white, appearing successively among the bractes, which are numerous, and form roundish, compact, terminal spikes. The calyx is tubular, five-toothed, with the teeth acute: the corolla funnel-shaped and bilabiate; the upper lip erect and roundish; the lower cut into three pointed segments.

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[1] Σαμψυχον Dioscoridis.

[2] Οριγανος Dioscoridis.

It is cut for medicinal use when it begins to flower in July.

Qualities. — The odour is pleasant, and the taste moderately warm, bitterish, and aromatic. Both alcohol and water extract the virtues of sweet marjoram; and in distillation with water it yields a large portion of volatile oil, which, on being long kept, becomes solid.

Medical properties and uses. — Sweet marjoram is tonic, and was formerly regarded as possessing errhine powers. It is scarcely ever used except as a culinary herb, or as an adjunct to cephalic snuffs, to which, however, it adds no efficacy.

OSSA. Bones. *Edin.*

Syn. Des Os (*F.*) Knochen (*G.*) Ossi (*I.*) Huesos (*S.*)

The bones of animals are composed of earthy salts, gelatin, albumen, and oil. According to the analysis of Fourcroy and Vauquelin, the components of ox bones are, in 100 parts, 51 of animal matter, 37.7 of phosphate of lime, 10 of carbonate of lime, and 1.3 of phosphate of magnesia. Besides these M. Hatchett detected sulphate of lime, and Berzelius some fluate of lime in bones.

OSTREA. *Syst. Nat. Gmelin.* vi. 3315.

Cl. 6. *Ord.* 3. Vermes Testacea.

G. 313. *Animal* Tethys. *Shell* bivalve; the valves unequal, and somewhat eared. *Hinge* toothless, but furnished with an ovate hollow cavity, with lateral transverse furrows. *Vulva*, or anus, none.

Species 105. O. *edulus.* The common Oyster. *Pennant's British Zoology*, iv. 102. *t.* 62.

Officinal. TESTÆ. *Lond.* The shells.

Syn. Ecailles des Huitres (*F.*) Austerschaalen (*G.*) Conchiglia d' Ostrica (*I.*) Cascara (*S.*)

This well-known shell-fish inhabits the European and Indian oceans throughout; and is particularly plentiful on the British coasts, which were early famed for producing the best oysters to supply the stews of ancient Rome, in the most luxurious period of its history.[1] They are naturally attached to shelving rocks; but for the facility of always obtaining them for the purposes of aliment, they are generally laid down near the shore. They are hermaphrodite, and throw out a spat in spring which gradually enlarges to a perfect oyster. The nature of the shell in some degree, and the taste and goodness of the fish, depend on the soil of the bed; they are tender and friable on a calcareous bottom, thick and solid on rocks, more glutinous on marle, and oily and luscious on a slimy bed. The green colour of those fed in pits on the coast of Holland has been supposed to be owing to copper; but it arises from a species of conferva which covers these stagnant pools.[1] The best oysters on the British shores are found at Purfleet, the worst near Liverpool. The oyster, when good, is very digestible and nutritious, particularly when eaten raw; and forms an excellent article of food for the phthisical, and convalescents. When they are sick, which is known by a black substance on the fringe or fin, or a very milky appearance of it, they are unwholesome. The shells only are officinal.

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[1] Sergius Ovata was the inventor of stews for oysters among the Romans. *Pliny*, lib. xiv. cap. 54.

Qualities.— Oyster shells consist of alternate layers of carbonate of lime and an animal matter supposed to be coagulated albumen. When thrown into a fire, they emit a great deal of smoke; the animal matter is destroyed, and the carbonic acid dissipated in the form of gas, while pure lime remains.

Medical properties and uses.—Oyster shells are antacid; but as in their unburned state they are less so than chalk, and when burned differ in nothing from lime; their retention in the list of materia medica is unnecessary.

Officinal preparation. *Testæ præparatæ.* L.

OVIS. *Syst. Nat. Gmelin.* i. 197.

Cl. 1. *Ord.* 5. Mammalia Pecora.

G. 31. *Horns* concave, rough, inclined outwards, and spirally twisted. *Cutting teeth* eight in the lower jaw. *Tusks* none.

Species. 1. O. *Aries*[2] The Sheep. *Buffon Hist. Nat.* v. *p.* 1. *t.* 1, 2.

Officinal. SEVUM. *Lond.* ADEPS OVILLUS. *Edin.* SEVUM; OVILLUM. *Dub.* Mutton Suet.

Syn. Graisse de Mouton (*F.*) Hammeltalg (*G.*) Grasse duro (*I.*) Grassa. (*S.*)

The sheep is too well known to require any description. It is an inhabitant of almost every climate, and delights in dry, saline, moderately elevated and warm pastures. It is the most innocent, simple, and timid of quadrupeds: scarcely ever living beyond fourteen years of age; yet liable to many diseases. There are several natural varieties of the sheep in the British islands, the largest of which is found in Lincolnshire, and the smallest in Zetland; and the number of these is much increasing by the cross breeds which, for the improvement of the wool and flesh, are annually effected. Mutton is less dense than beef, very digestible and wholesome, and is at its greatest perfection when about five years old. It is very much improved by the castration of the animal, and is then called wether mutton. The broth made of it does not agree so well as light beef tea or veal tea, with delicate and weakened stomachs, but it forms an excellent emollient enema in cases of ulceration or abrasion of the rectum; and in that state of the bowels of infants which occasions green stools and aphthæ.[1] The suet, which is the officinal part of the animal, is chiefly obtained from about the kidneys and loins.

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[1] Beckman's Observations, *Phil. Mag.* vi. 97. In Scotland, oysters laid down to feed near the salt-works on the shore, attain a large size and a great richness of flavour: they are called Pandoors, and are much esteemed.

[2] Προϐατον *Aristot. Hist. Animal.* v. cap. 11.

Qualities.—Suet is the most consistent of the real animal fats. It is white, has some degree of brittleness; is inodorous, and requires a temperature of 127° Fahrenheit to melt it. In other respects, it agrees with the other animal fats. (See the qualities of fat under *Sus scrofa.*)

Medical properties and uses.—Like the other fats, suet is emollient. It is sometimes boiled in milk in the proportion of ℥ij of the suet to Oj of milk; and a cupful of the mixture given occasionally in chronic diarrhœa, when there is much acrimony of the contents of the bowels; but its principal use is to give consistence to ointments and plasters.

Officinal preparation. *Sevum præparatum.* L.

OVUM. See *Phasianus.*

OXALIS.[2] *Spec. Plant. Willd.* ii. 772.

Cl. 10. *Ord.* 5. Decandria Pentagynia. *Nat. ord.* Gruinales *Linn.* Gerania *Juss.*

G. 918. *Calyx* five-leaved. *Petals* connected by claws. *Stamens* unequal, the five shorter exterior ones connected at the base. *Capsules* opening at the corners, five-cornered.

*** *leaves ternate, scape one-flowered.*

Species 25. O. *Acetosella.* Wood-sorrel. *Med. Bot. 2d edit.* 563. *t.* 201. *Smith Flor. Brit.* 491. *Jacquin's Oxalis*, 114. *t.* 80. *f.* 1.

Officinal. ACETOSELLA. *Lond.* Wood-sorrel.

Syn. Oseillé des Bucherons (*F.*) Sauerhlee (*G.*) Acetosa salvatica (*I.*) Oxalide arederilla (*S.*)

This is an indigenous perennial plant, found in woods, under hedges and other shaded places, and flowering in April and May. The root is horizontal, toothed, fleshy, and of a reddish colour. The leaves are all radical, ternate like the trefoil, and petioled; with the leaflets obcordate, very entire, hairy, of a yellowish green colour, and purplish underneath. The scape or flower-stalk is furnished with two scaly bractes, placed about an inch and a half beneath the flower, which is sub-nutant, delicate, and of a flesh colour streaked with red. The calycine leaflets are oblong, oval, acute, ciliated, and purple at the tip. The corolla is bell-shaped: with the claws of the petals upright, and the borders obovate, rounded, and spreading: the filaments are somewhat connate at the base, and furnished with oblong incumbent anthers; and the styles smooth, rising from an ovate germen. The capsule is membranous, and contains two seeds in every cell. Each seed is invested with a fleshy white aril; at first smooth and closed on every side, but at length, opening at the apex elastically, it rolls back and throws off the seed with considerable force.[1]

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[1] The milk of the ewe is seldom used either as aliment or medicine. It contains more cream and less whey than cow's milk, but the butter yielded by it never acquires a proper consistence. It is made into cheese in Scotland, which is bitterish; and when old warm and biting. It resembles Parmesan cheese.

[2] Οξαλις Dioscoridis.

Qualities.—This plant is inodorous, and has a pleasant acidulous taste. The expressed juice reddens vegetable blues; coagulates milk, and instantly precipitates lime from its solutions. Its active principle is superoxalate of potash, which is obtained crystallized from the expressed juice, and sold in the shops under the name of *Essential salt of lemons.*[2] The same salt may be formed by cautiously dropping a solution of potash into a saturated solution of the oxalic acid, obtained from sugar by the action of the nitric acid; the superoxalate precipitates as soon as the proper quantity of alkali is added.[3]

Medical properties and uses.—Wood-sorrel is refrigerant and antiseptic. Boiled with milk it forms a pleasant whey, which may prove a useful refrigerant in fevers, as may also the expressed juice, or the superoxalate obtained from it diluted with water: but although they are much extolled in inflammatory, bilious, and putrid cases, by the continental physicians, yet their place is well and easily supplied by lemon juice, or the citric acid, dissolved in water. The recent herb eaten as a salad, may be serviceable in scorbutic affections.

PAPAVER. *Spec. Plant. Willd.* ii. 1144.

Cl. 13. *Ord.* 1. Polyandria Monogynia. *Nat. ord.* Rhoedææ *Linn.* Papaveracæ *Juss.*

G. 1015. *Corolla* four-petalled. *Calyx* two-leaved. *Capsule* one-celled, opening by pores under the persistent stigma.

** *with smooth capsules.*

Sp. 5. P. *Rhoeas.* Corn or Red Poppy. *Med. Bot. 2d edit.* 387. *t.* 139. *Smith Flora. Brit.* 567. *Eng. Bot.* 645.

Sp. 7. P. *somniferum.* White Poppy. *Med. Bot. 2d edit.* 376. *t.* 138. *Smith Flora. Brit.* 568.

1. PAPAVER RHOEAS.[4]

Officinal. RHOEADES PETALA. *Lond.* PAPAVER ERRATICUM; PETALA. *Dub.* Petals of the Red Poppy.

Syn. Coquelicot (*F.*) Klatschrossen (*G.*) Passavero salvatico (*I.*) Adormidera sylvestre; Amapola (*S.*)

This species of the poppy is an indigenous annual, growing in the greatest abundance in corn-fields, and waste places, and flowering in June and July. The stem rises about a foot in height, is branched, and every where furnished with stiffish horizontally spreading hairs. The leaves are sessile, pinnatifid, sometimes doubly so, serrated or cut, and generally hairy. The flowers are solitary, on slender hairy peduncles; the calyx consists of two ovate, rough, concave leaves, which fall before the petals expand; these are four, large, roundish, unequal, and spreading, of a full bright scarlet colour, and sometimes marked with a black spot at the base. The germen is ovate, smooth, with a convex, sessile, shield-like stigma, scalloped on the edge, having many purple-coloured rays; and becomes an urn-shaped capsule.[1]

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[1] *Gærtner de Fructibus*, ii. 152. t. 113. fig. 5.

[2] This salt is prepared on the continent by the following process: The juice is allowed to subside after being slightly heated, and then clarified by adding to it water, in which a small portion of fine clay is suspended. This clarified juice is next boiled till a pellicle forms on its surface, and put aside for a month to crystallize; the operation being repeated until the whole of the salt is obtained, when it is purified by a second crystallization. *Annales de Chimie*, xiv. 7. The essential salt of lemon of the shops is generally one half cream of tartar.

[3] *Crell's Annals*, (trans.) i. 107.

[4] 'Ροιας Dioscoridis.

The petals must be gathered when they begin to blow, as they very soon drop after they are fully expanded.

Qualities.—They have a faint narcotic odour, and a mucilaginous, very slightly bitter taste. They yield their colouring matter to warm water; and on this account only are used, as they cannot be said to possess any anodyne properties.

Officinal preparation. *Syrupus Rhoeades.* L. D.

2. PAPAVER SOMNIFERUM.

Officinal. PAPAVERIS CAPSULÆ. OPIUM. *Lond.* PAPAVERIS SOMNIFERI CAPSULÆ. OPIUM. *Edin.* PAPAVER ALBUM; CAPSULÆ; OPIUM; SUCCUS CONCRETUS. *Dub.* Poppy capsules or heads; and Opium.

Syn. Capsules des pavots blanes; Opium (*F.*) Capi del Papavero; Oppio (*I.*) Adormideras; Opio (*S.*) Afeeoan (*Arab.*) Afiun (*H.*)

The somniferous or white poppy is a native of Asia; and although it is found growing wild in the southern parts of Europe, and even in England, yet, there is every reason for thinking, that its seed must have been carried to these parts. It was very early cultivated in Greece, perhaps, at first solely for the sake of its seed, which was used as food[2]; and in the present age, not only on account of the opium, for which it is reared in Turkey and India, but also on account of the capsules, and of the bland oil obtained from the seeds, the poppy is extensively cultivated in most of the states of Europe.[3] It is an annual plant, flowering in July, with a glaucous coloured, smooth, erect, round stem, rising to the height of five or six feet, when in a favourable situation. The leaves are large, simple, obtuse, lobed and crenated, and embracing the stem on which they are alternately placed. The flowers are large and terminal; the calyx is formed of two smooth, ovate, bifid, con-

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[1] This form of capsule easily distinguishes it from Papaver *dubium*, which has a long narrow capsule, but in other respects closely resembles the corn poppy.

[2] Homer notices it under the name of *μηκων*, as a garden plant; and it is said to be nourishing, by Hippocrates: the seeds are not narcotic.

In England, it has been cultivated for the purpose of obtaining opium; and a Mr. Ball, in 1796, received a premium from the Society for the Encouragement of Arts, for a specimen of British opium little inferior to the Oriental; but the project of making opium in this country has not been pursued to any useful extent. *Transactions of the Society of Arts*, xiv. 260 to 270.

cave leaves, that drop on the expanding of the petals; which are four in number, large, roundish, entire, somewhat undulated and white: the filaments are very numerous, slender, shorter than the corolla, and support erect, compressed anthers; and the germen, which is globular, is crowned with a many-rayed stigma. The capsule, which stands on a short pedicel, is globular when well grown, from three to four inches in diameter, a little flattened at the top and bottom, and crowned with the persistent stigma, the segments of which stand erect, and have an elegant appearance. The seeds are small, and very numerous.

All the parts of the poppy contain a white opaque narcotic juice; but it abounds more in the capsules: hence these are the only officinal parts of the plant, and for them chiefly is the plant cultivated in this country. They are gathered as they ripen; and as this happens at different times, there are annually three or four gatherings. They are brought to market in bags, each containing about 3000 capsules, and sold to the druggists.[1]

The milky juice of the poppy in its more perfect state, which is the case in warm climates only, is extracted by incisions made in the capsules, and inspissated; and forms the opium of commerce. The plants during their growth are carefully watered and manured, the watering being more profuse as the period of flowering approaches, and until the capsules are half grown, when it is discontinued, and the collection of the opium commences. At sun-set, longitudinal incisions are made upon each half-ripe capsule, passing from below upwards, and not penetrating to the internal cavity. The night dews favour the exudation of the juice, which is collected in the morning by old women and children, who scrape it from off the wounds with a small iron scoop, and deposit the whole in an earthen pot, where it is worked by the hand in the sunshine, until it attain a considerable degree of spissitude. It is then formed into cakes, which are laid in earthen basins to be further exsiccated, when it is covered over with poppy or tobacco leaves.[2] Such is the mode followed in India, and according to Kæmpfer's account nearly the same is practised in Persia: and when the juice is drawn in a similar manner in this country, and inspissated, it has all the characters of pure opium.

Opium is brought to this country in chests from Turkey and India. The *Turkey opium* is in flat pieces, covered with leaves, and the reddish capsules of some species of rumex, which is considered an indication of its goodness, as the inferior kinds of opium have none of these capsules adhering to them. Turkey opium generally contains about one-fourth part of impurities. *East Indian opium* is in round masses, covered with successive layers of leaves, to the thickness nearly of ¼th of an inch. Mr. Kerr relates, that at Bahar it is frequently adulterated with cow-dung, the extract of the poppy procured by boiling, and various other substances. In Malava it is mixed with oil of sesamum, which is often one half of the mass: ashes and the dried leaves of the plant are also used.

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[1] The London market is chiefly supplied from Mitcham in Surry. The average price of each bag containing 3000 capsules, is about 4*l.* 10*s.*—*Stevenson's Survey*, 382.

[2] *Med. Observ. and Inquiries*, v. 317.

Opium is regarded as bad when it is either very soft or friable, of an intensely black colour, or mixed with many impurities. A weak or empyreumatic odour, sweetish taste, or the power of marking, when drawn across paper, a brown continuous streak, are also symptoms of inferior opium.

Qualities. — 1. *The dried capsule* of the poppy is inodorous, and nearly insipid, a slight degree of bitterness only being perceptible when it is long chewed. Water by coction extracts its virtues; and when the decoction is evaporated, an extract is obtained, with properties similar to opium, but less powerful.

2. *Turkey opium* has a peculiar, strong, heavy, narcotic, odour, and a bitter taste, which is accompanied with a sensation of acrid heat, or biting on the tongue and lips, if the opium be well chewed. Its colour, when good, is a reddish brown, or fawn colour, its texture compact and uniform. When soft, it is tenacious; but when long exposed to the air, it becomes hard, breaks with an uniform shining fracture, is pulverulent, and affords a yellowish powder. It is inflammable, and partially soluble in water, vinegar, lemon juice, wine, alcohol, and ether. By long boiling in water under exposure to the air, its narcotic powers are impaired; yet nothing rises with water, when it is distilled with that fluid.[1] When carefully triturated with hot water, about five parts in twelve of the opium are dissolved and retained in solution, nearly six parts are simply suspended, and rather more than one part remains perfectly insoluble, of a viscid, plastic nature, somewhat resembling the gluten of wheat, but of a dark colour. Bucholz regarded this as caoutchouc; according to Proust it contains wax; and Gren supposed it to be analogous to gluten. By digesting alcohol on this substance I found that it dissolved a small portion of it, acquired a reddish yellow colour and became milky when added to water. Sulphuric ether digested on it, broke it down, and dissolved a portion of it, forming a yellowish tincture, which when evaporated on water left resin, a bitter extractive, and some acicular crystals of that salt which Derosne supposed to be the narcotic principle. The insoluble part, after the action of the ether, was subjected to a set of comparative experiments with the gluten of wheat,

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[1] Beaumé, however, asserts that the odorous part of the opium is an oil.

when it afforded similar results with the majority of the tests employed. Hence this part of Turkey opium appears to be a modification of gluten combined with resin, extractive, and a peculiar salt.

3. *East Indian opium* has a strong empyreumatic smell, and less of the peculiar narcotic heavy odour of the Turkey opium; the taste is more bitter, and equally nauseous, but it has less acrimony: it agrees with the Turkey opium in its other sensible qualities, except that its colour is blacker, its texture less tenacious; and when triturated with water no insoluble plastic residuum is left, but it is altogether taken up; eight parts in twelve being dissolved, and the remainder suspended in the fluid.

The aqueous solutions of both kinds of opium are transparent when filtered, that of the East Indian having the deepest brown colour; both redden litmus paper; neither is decomposed by alcohol, but both are precipitated by the carbonates of potass and of soda, and by pure ammonia; precipitates are also formed by solutions of the muriate and nitrate of mercury, the acetate and super-acetate of lead, the nitrate of silver, and the sulphates of copper, of zinc, and of iron. They are also precipitated by infusion of galls; the precipitate, as doctor Duncan justly observes, resembling more that produced by cinchonin, than that by gelatine.[1] The solution of acetate of barytes does not alter the solutions of Turkey opium, but produces a copious precipitate with those of the East Indian; oxalic acid precipitates both, but the latter more copiously. From these experiments opium appears to contain resin, gum, bitter extractive, a peculiar crystallizable salt, and sulphate of lime, which appears to be very abundant in the East Indian opium: the Turkish contains besides, a species of gluten, and perhaps caoutchouc.

When ether is used as a menstruum for opium, and the resin and extractive which it takes up are separated by evaporating the tincture on the surface of water, the pellicle of resin deposited is nearly insipid, while the extractive dissolved in the water has an intensely bitter taste: from this fact, and the circumstance already mentioned of opium becoming inert when boiled in water, we might venture to conclude that the narcotic principle resides in the extractive. Derosne in 1804, asserted that the activity of opium depends on a peculiar salt. He evaporated a watery infusion of opium to the consistence of syrup, and digested the gritty precipitate formed by this evaporation in hot alcohol: as the solution cooled, a salt formed, which by repeated solutions and crystallizations was obtained free from the resin, of a white colour, and in rectangular prisms with rhomboidal bases; these were inodorous, insipid, insoluble in cold water, but soluble in 400 parts of boiling water; soluble in 100 parts of cold, and 24 of boiling alcohol; soluble in hot ether and the volatile oils, but separating as these fluids cooled; and very soluble in all the acids. Given to dogs, it produced the effects of a strong dose of opium; but the bad effects were relieved by vinegar. In repeating the experiments of Derosne, I obtained a much greater proportion of crystals of this peculiar salt from East Indian than from Turkey opium, which I conceived to militate against his idea of its being the narcotic principle, in as much as larger doses of that variety of opium are required to produce its narcotic effect on the system. I have had no opportunities of ascertaining the power of the salt; but from Derosne's account it is not much more powerful as a narcotic than opium itself.[1] My scepticism on this subject has been confirmed by the discovery of M. Sertuerner. The first experiments of this chemist were made public about the same time as those of Derosne: but they excited little attention until he published a second memoir in 1817. According to Sertuerner the salt of Derosne is not the narcotic principle of opium, but a combination of it with a peculiar acid which he discovered in opium, and named the *meconic*, the narcotic principle being according to him an alkaline salt, which he had obtained in a separate state. This salt has been named *morphia*. Robiquet, however, has demonstrated the fallacy of Sertuerner's opinion as far as it concerns Derosne's salt; but has confirmed his statement regarding the existence of *morphia*. To obtain it, he orders a concentrated solution of opium to be boiled for a quarter of an hour, with a small quantity of magnesia. A greyish precipitate forms, which is to be separated by filtration, washed on the filter with cold water, dried, and then digested for some time with weak spirit, in a moderate heat, in order to separate the colouring matter. The residue is now again to be separated by the filter, washed with a little cold alcohol, and then boiled in a large quantity of rectified alcohol: on filtering the solution whilst it is yet boiling, morphia beautifully crystallized and almost free from colour is deposited as it cools. By repeating the last part of the operation three or four times, with the residue of the previous boilings, the whole of the[2] morphia is obtained. The salt thus procured is colourless and crystallized, in regular parallelopipeds. It burns without leaving any residue; restores, like the alkalies, the colour of reddened turnsole, browns turmeric paper, and readily combines with acids forming neutral salts. It is but little soluble in water or in cold alcohol, or ether; but, is readily soluble in the two latter fluids in the boiling state; the salt being again precipitated in crystals as the solutions cool. As an alkali, it holds the next place to ammonia, having less affinity for the acids than either that salt or magnesia. Morphia being scarcely soluble in water or in the fluids of the stomach in its uncombined state, does not display in a striking manner its properties when exhibited alone; but these are very striking when it is combined with acids, particularly the acetic, or the meconic; with the latter of which it exists in opium a state of combination, as a super-meconate.

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[1] *Edinburgh New Dispensary*, 5th edit. 332.

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[1] *Annales de Chimie*, lxv. 270. Derosne concludes from the effects of nitric acid and caloric on this salt, that it is composed of oxygen, hydrogen, azote, and carbon. It does not redden vegetable blues. *Ibid.* p. 279.

[2] *Annales de Chimie & de Phys.* tome v. p. 275.

In repeating Sertuerner's experiments, I obtained from *Turkey* opium nearly three times the quantity of morphia yielded by *East Indian* opium; that from the latter was also more coloured, and in smaller crystals. Although the utmost nicety of manipulation was not attended to in these experiments, yet as both specimens were treated exactly in the same manner, the experiments are sufficient to shew the comparative richness of these varieties of the drug in this salt; and the result is certainly in favour of the opinion that the narcotic property of opium depends on this alkaline salt; and accounts for the fact which has been stated above, that much larger doses of the East Indian opium are required to produce its sedative effect on the system. Practitioners and physiologists in this country have not yet made any decisive experiments with morphia, to determine its effects on the animal economy; but this point has been investigated by M. M. Orfila and Majendie.[1] The experiments of the former being made upon dogs, they can be regarded as important only inasmuch as they confirm the opinion, that opium owes its soporific powers to this salt, and displays the comparative activity of the different combinations of the salt. Of the saline compounds he found the acetate the most powerful; but a solution of morphia in olive oil acts with still greater intensity, and with more than double the effect of the aqueous extract of opium. The experiments of M. Majendie being made on the human subject, are more interesting. He found that a quarter of a grain of acetate of morphia produces the most beneficial effects that can be expected from an anodyne, allaying pain and procuring sleep without, in any degree, affecting the cerebral functions. The sulphate acts in a similar manner but with less energy.

Medical properties and uses.—Poppy heads or capsules possess anodyne properties: they are chiefly employed, boiled in water, as fomentations to inflamed and ulcerated surfaces; and a syrup prepared with the inspissated decoction is used as an anodyne for children, and to allay the tickling cough in chronic catarrh, and phthisis.

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[1] *Nouveau Juourn. de Medicine*, tom. i. p. 1. 23.

Opium operates as a powerful and very diffusible stimulus, but its primary operation is followed by narcotic and sedative effects in a degree much greater than could be expected from the previous excitement it induces. It acts directly on the nervous system, and when taken into the stomach destroys irritability, and allays pain in the most distant parts of the body, independent of the circulation, and without inducing any change on the composition of the blood. As the principle, therefore, on which opium acts is the same over all the body, the topical application of it is capable of producing similar effects, only in a diminished degree, to those resulting from it when it is taken into the stomach. The larger the dose is, the more quickly its primary action is extended over the whole habit; and as every part is excited nearly at the same moment of time, the general consequent exhaustion must necessarily more rapidly follow than when the dose is merely sufficient to induce a degree of excitement, scarcely exceeding the powers of the system on which it operates. Hence either the stimulant or the sedative effects of opium may be rendered obvious by the nature of the dose in which it is exhibited; and the early knowledge of this truth might have saved much of the keen controversy which this subject at one period occasioned.

In moderate doses opium increases the fullness, the force and frequency of the pulse, augments the heat of the body, invigorates both the corporeal and mental functions, exhilarating even to intoxication[2]: but by degrees these effects are succeeded by languor, lassitude and sleep; and in many instances headach, sickness, thirst, tremors, and other symptoms of debility, such as follow the excessive use of ardent spirits, supervene. In very large doses the primary excitement is scarcely apparent, but the pulse seems to be at once diminished, drowsiness and stupor immediately come on, and are followed by delirium, sighing, deep, and stertorous breathing, cold sweats, convulsions, apoplexy and death. The appearances on dissection are those which indicate the previous existence of violent inflammation of the stomach and bowels; but notwithstanding the

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[1] The Turks call opium *afioni*; and in the *teriakihana*, or opium shops of Constantinople, they take it in graduated doses from ten grains to one hundred grains in a day. It is mixed with rich syrup and the inspissated juices of fruit to render it more palatable and less intoxicating; and is taken with a spoon, or made up into small lozenges stamped with the words *Mash Allah*, literally "The work of God." The Tartar couriers who travel great distances, and with astonishing rapidity, take nothing else to support them during their journeys. *Dallaway's Constantinople*, 4to. 78.

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symptoms of apoplexy which an overdose when it proves fatal occasions, no particular appearance of an inflammatory state or fullness of the vessels of the brain are perceived.

Opium is efficaciously given in some diseases of debility, as, for instance, fevers of the typhoid kind, and intermittents; and combined with calomel to check the progress of gangrene. In typhus, when given in small doses frequently repeated, it is an useful assistant to wine and tonics in supporting the vis vitæ; and at the same time allaying irritation, and obtunding the susceptibility of those morbid impressions which occasion watchfulness, delirium, tremors, and subsultus tendinum. It is to this effect of it that Alibert and others ascribe its power, when moderately used, of rendering the human body less susceptible to different diseases.[1] Some caution, however, is required in its exhibition; for if the heat of the body be much above the natural standard, and the skin dry, opium increases these symptoms, augments thirst, and occasions restlessness. But if moisture be coming on, opium accelerates it, and tranquillity and sleep follow. Hence the propriety of Dr. Currie's advice, not to give the evening dose of opium in these fevers till very late or about one or two o'clock in the morning, when the heat is subsiding; or first to lower the temperature, and excite sensible perspiration by the effusion of cold water, or tepid sponging.[2] It is hurtful also where there is any disposition to local inflammation, particularly of the chest; and where there is much determination to the head. Opium very materially assists the bark in curing intermittents, and prevents it from running off by the bowels. When given at the approach of the paroxysm, it sometimes checks its attack, or shortens and renders it milder, and abates the violence of the hot stage by determining to the surface, and inducing sleep.

In acute rheumatism opium is given united with ipecacuanha or antimonials, and nitre, and always relieves when it determines to the surface. In the other phlegmasiæ[3], however, it cannot with propriety be used in the early stages; but after the inflammatory action is subdued, it is useful in quieting cough, allaying pain, and procuring sleep.

In eruptive diseases, particularly small-pox, the liberal use of opium is found to be highly beneficial, when convulsions precede the appearance of the eruption, or if the accompanying fever assume the typhoid type. In malignant scarlatina, pemphigus, and several others of the exanthemata, it is equally valuable; but its use is contra-indicated in this class of diseases when the fever is inflammatory.

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[1] *Nouveaux Elemens de Thérapentique*, &c. 4 edit. tome xi. p. 76.

[2] *Medical Reports on the Use of cold and warm Water*, i. 290.

[3] Were it allowable in this work to criticize nosological arrangements, we might justly question the propriety of placing rheumatism among the phlegmasiæ.

In the hæmorrhagiæ it is useful when the discharge arises chiefly from an increased degree of irritability, and where the pulse, instead of being strong and full, is small, quick, and intermitting. Hence its efficacy in the floodings of weakened habits after abortions and in phthisical hæmoptysis. It has been recommended also after blood-letting, in the hæmoptysis and hæmatemesis of the later months of pregnancy.

Although opiates are hurtful at first, and check expectoration in catarrh, yet when the cough remains obstinate their good effects are undoubted; and in the contagious catarrh or influenza, an opiate at bed-time is requisite for quieting the cough in every stage of the disorder. In dysentery, also, the benefit to be derived from opium depends very much on the bowels having been previously well cleared, in which case it allays the tormina and tenesmus; and the same remark applies to diarrhœa.

But the spasmodic and convulsive diseases are those in which opium is most evidently useful. In tetanus, although it does not always succeed, even when given in the largest doses, yet, many cases have occurred in which the continued exhibition of large doses has overcome the spasm, and cured the disease; particularly when it has been judiciously combined with cathartics: often, however, very large quantities of the remedy have been taken without any sensible effect on the state of the habit, and without relieving the disorder; and the same is the case in hydrophobia, in which 180 grains of solid opium have been taken in the space of twelve hours without producing any apparent effect. It has been found beneficial in chorea; but as in tetanus, it is necessary to precede its use by strong cathartics, or at least to give it in combination with these.[1] In epilepsy it proves useful when given in combination with musk; and it has been recommended by highly respectable authority[2] in eclampsia, but its efficacy in this complaint is rather doubtful. In spasmodic asthma it shortens the paroxysms, abates the violence of the cough in pertussis, when given after the primary fever subsides; and is more especially useful in pyrosis and cholera than any other medicine. Solid opium, either alone or united with camphor, is the most effectual remedy for checking obstinate vomiting proceeding from a morbid irritability of the stomach. In colic and ileus it is given in combination with laxatives, and allays the spasm and pain; nor is it less efficacious in flatulent colic with hernia. As a remedy in lues venerea opium is still relied on by some foreign practitioners, but the idea of its anti-venereal powers has been justly exploded in this country; and it is properly regarded only as an useful adjunct to mercury in this disease: "by diminishing the sensibility of the stomach and bowels, it prevents many of those inconveniences which this mineral is apt to excite in the primæ viæ, and allows it to be more easily introduced into the system."[1] In short, in all cases where the irritability is morbidly increased, and where it is of importance to lessen pain, and procure sleep, opium is undoubtedly the most valuable article of the materia medica.

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[1] *Observations on the Administration and Utility of Purgative Medicines, &c.* 86.
[2] Denman. Bland.

Opium is contra-indicated in all morbid states of the body where a strong inflammatory diathesis exists; in pulmonary affections, when the cough is dry and hard, and the expectoration difficult and scanty; and if not hurtful, its use is at least doubtful in mania, in which it generally occasions restlessness instead of procuring sleep.

Externally used, opium is almost as efficacious as when it is taken into the stomach, and produces its narcotic effects without affecting the head or producing nausea. It is applied in the form of frictions, either combined with oil, or with the camphor liniment, or in the form of tincture: thus applied, it may be used in all the diseases above enumerated. We have often seen its good effects in colic; and have also witnessed its singular efficacy in symptomatic trismus, when rubbed on the jaw, and applied to the scrobiculus cordis by means of pledgets soaked in the tincture. A piece of solid opium stuffed into a carious tooth relieves the pain of tooth-ach; and introduced into the rectum, either in the solid form or dissolved in water as an enema, it affords relief in tenesmus, in painful affections of the prostate gland, and in spasmodic strictures. A weak watery solution of it also is an useful adjunct to injections in gonorrhœa, and to collyria in ophthalmia; and the vinous tincture dropped into the eye removes the suffusion which often remains in that disease after the inflammation has been subdued; and restores the tone of the diseased organ. The aqueous solution also lessens the pain of open cancer, when cloths soaked in it are laid over the sore.

Opium is exhibited either in substance as a pill, or under the form of tincture. It is necessary to avoid combining it with substances which decompose it; and therefore solutions of oxymuriate of mercury, acetate of lead, sulphates of zinc, iron, and copper; of the carbonates of alkalies, lime water, infusion of galls, and infusion of yellow cinchona bark, are incompatible in prescriptions with opium. In combination, however, with vinegar, the vegetable acids and oil, its narcotic power is much increased.[1]

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[1] *Pearson's Observations, &c. on Articles used in the Cure of Lues Venerea*, p. 60.

The dose of opium varies according to the nature of the disease, and the peculiar intention for which it is ordered. The circumstance of the patient having been previously accustomed to its use must also regulate the extent of the dose; for in this case a dose, which to one unaccustomed to its use would prove fatal, may perhaps to another in the habit of taking it be scarcely sufficient to produce its narcotic effects. A quarter of a grain, or even less, frequently, repeated, is, in general, sufficient to keep up its stimulant effect; and from gr. j. to grs. ij. act as a narcotic, and produce sleep; while in tetanus, hydrophobia, and some other diseases, f℥vſs of laudanum have been given in twenty-six hours, without occasioning any bad effects, or even producing sleep.[2]

The use of opium for the purpose of exhilarating the spirits has long been used in Turkey, Syria, and China; and of late years it has been unfortunately adopted by many, particularly females, in this country. Russell[3] says that in Syria, when combined with spices and aromatics, he has known it taken to the amount of ʒiij in twenty-four hours. Its habitual use cannot be too much reprobated. It impairs the digestive organs, consequently the vigour of the whole body, and destroys also gradually the mental energies. The effects of opium on those addicted to its use, says Russell, are at first obstinate costiveness, succeeded by diarrhœa and flatulence, with loss of appetite and a sottish appearance. The memories of those who take it soon fail, they become prematurely old, and then sink into the grave objects of scorn and pity.[1]

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[1] The effects of vegetable acids in augmenting the efficacy of opium is explained by what has been said on the combinations of morphia. The greater power of that preparation of opium, which has been known, for upwards of a hundred years, under the name of "Black Drop," appears to depend on its containing an acetate of morphia. The following is the mode of preparing it, as published by Dr. Armstrong, (vide *Practical Illustrations of Typhus,*) from the papers of the late Edward Walton, of Sunderland, one of the near relations of Edward Tonstall, of Bishop's Auckland, by whom it was originally prepared.

"Take half a pound of opium sliced; three pints of good verjuice; one and a half ounce of nutmegs; half an ounce of saffron. Boil them to a proper thickness, then add a quarter of a pound of sugar, and two spoonsful of yeast. Set the whole in a warm place near the fire, six or eight weeks, then place it in the open air until it becomes a syrup; lastly decant, filter, and bottle it up, adding a little sugar to each bottle."

One drop of this preparation is calculated to be equal to three drops of the Tincture of Opium, of the London College.

There is also some reason for thinking that another preparation of opium, the *Liquor Opii Sedativus,* of Mr. Batley, of Fore-Street, London, which has been justly esteemed one of the best preparations of the drug hitherto discovered, owes its efficacy to the acetate of morphia. The mode of preparing it is as yet kept secret; but I know that the whole of the resinous part of the opium employed is separated and rejected; and I am inclined to believe that acetic acid is employed to separate the gummy part.

[2] *Currie's Medical Reports, &c.* i. 138.

[3] *History of Aleppo,* i. 128.

When opium has been taken in an overdose, the first thing to be done for counteracting its bad effects is the exhibition of a powerful emetic; and for this purpose ℈j of sulphate of zinc, or from grs v. to grs x. of sulphate of copper dissolved in water should be immediately swallowed; and the vomiting kept up for a considerable time, and urged by irritation of the fauces. Large draughts of vinegar and water, or other acidulated fluids should afterwards be frequently taken; and the powers of the habit supported by brandy, coffee, and cordials. The sufferer should be kept awake, and, if possible, in continued gentle motion. Currie recommends for removing the drowsiness the affusion of warm water at 106° or 108°.[2]

Officinal preparations. Of the poppy capsules—*Decoctum Papaveris.* L. *Extractum Papaveris.* L. E. *Syrupus Papaveris.* L. E. D. Of Opium—*Opium purificatum.* D. *Confectio Opii.* L. E. *Extractum Opii.* L. E. D. *Pilulæ Opii.* E. *Pilulæ Saponis cum Opio.* L. *Pulvis opiatus.* E. *Pulvis Cornu usti cum Opio.* L. *Pulvis Cretæ comp. cum Opio.* L. *Pulvis Ipecacuhanæ comp.* L. E. D. *Tinctura Opii.* L. E. D. *Tinctura Camphoræ composita.* L. D. *Tinctura Opii ammoniata.* E. *Trochisci Glycyrrhizæ cum Opio.* E.

PASTINACA. *Spec. Plant. Willd.* i. 1465.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. Ord.* Umbellatæ.

G. 558. *Fruit* elliptical, compressed, flat. *Petals* involute, entire.

Species 3. P. *Opoponax.* Opoponax, or Rough Parsnip. *Med. Bot. 2d ed.* 122. *t.* 47.

Officinal. OPOPONACIS GUMMI RESINA. *Lond.* Opoponax.

Syn. Opoponax (*F.*) Panax gummi (*G.*) Opoponace (*I.*) Iáwesheer (*Arab.*)

This species of parsnip is a perennial plant, a native of the south of Europe, flowering in July. The root is as thick as the human arm, branched, of a yellow colour, and covered with a corky bark: the stem rises about five feet in height, the thickness of a man's finger, round, striated, scariose at the base, angular at the summit, and shining: the radical leaves are simple, cordate, and crenated; those of the stem ternate and quinate, with the terminal leaflet cordate and very large: the whole are petiolate, with the petioles sheathing, and the leaflets hairy on the under surface: the umbelliferous branches are very smooth; first alternate, erect; then two, three, or four together, in a sort of whorl, two or three inches long, with one or two spathaceous leaflets towards the middle or at the top: the universal umbels have seven or eight rays, an inch long, of a yellowish green colour: both the involucres and involucels consist of from four to six very short leaflets, frequently permanent. The fruit is flat.

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[1] Mustapha Shatoor, an opium eater in Smyrna, took daily three drachms of crude opium. The visible effects at the time were the sparkling of his eyes, and great exhilaration of spirits. He found the desire of increasing his dose growing upon him. He seemed twenty years older than he really was; his complexion was very sallow, his legs small, his gums eaten away, and the teeth laid bare to the sockets. He could not rise without first swallowing half a drachm of opium. *Phil. Trans.* xix. 289.

[2] *Reports on Water*, i. 80.

In the Levant, where this plant grows, the milky juice which exudes from incisions made in the roots, and dried in the sun, forms the opoponax of the shops. It is imported from Turkey and India in chests; and is sometimes in tears or drops, but more usually in irregular lumps.

Qualities.—Opoponax has a strong disagreeable smell and a bitter acrid taste. The masses are of a reddish yellow colour, speckled with white on the outside, paler within, and frequently variegated with large white pieces. Its specific gravity is 1·622.[1] It appears to be a compound of gum, resin, starch, extractive, wax, malic acid, a trace of caoutchouc,[2] and essential oil. When triturated with water, about one half of it dissolves, forming an opaque milky solution, which deposits, on standing, a portion of resinous matter, and becomes yellowish. Alcohol acts feebly on it; and in distillation either with it or with water, the odour of the opoponax is very strongly communicated to the fluids, but scarcely any oil is obtained in a separate state.

Medical properties and uses.—This gum resin is regarded as antispasmodic and emmenagogue, and as such has been used in hysteria and chlorosis; but it is very seldom ordered. The dose may be from grs. x. to ʒſs.

PETROLEUM. Vide *Bitumen.*

PHASIANUS. *Syst. Nat. Gmelin.* i. 737.

Cl. 2. *Ord.* 5. Aves, Gallinæ.

G. 101. *Beak* short, strong. *Cheeks* made smooth, with a naked skin. *Feet* spurred.

Species 1. P. *Gallus.* The Dunghill Fowl. *Willd. Ornith.* 154. *t.* 26.

Officinal. OVA. *Lond.* The Egg.

Syn. Œuf (*F.*) Hühnereier (*G.*) Ouvo (*I.*) Huevo (*S.*)

The common domestic fowl is too well known to require any description. The country whence it originally came has not been correctly ascertained; although it is conjectured that it was brought from Persia by the Phœnicians, about 500 years before the birth of Christ.[3] As an article of food it is the least stimulating of animal substances; and the broth made of the young fowl or chicken is not only the best restorative diet for the convalescent, but is also a useful diluent in cholera, dysentery, and other disorders of the bowels. After they are a year old, their flesh becomes less and less digestible; but the capon and poulard retain their tenderness longer.

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[1] Brisson.

[2] Pelletier, *Ann. de Chim.* lxix. p. 90.

[3] *British Zoology*, i. 280. There is a variety of the common fowl, named the *Dorking Fowl,* from being generally procured at Dorking, in Surry, which has two toes behind instead of one. Another variety is found at Mozambique, and at Siam, which has the skin, bones, periosteum, and sometimes the flesh, quite black, and yet is esteemed good eating.

The egg consists of two distinct fluid matters, the white and the yolk; the membranes which inclose these, and the shell.[1]

Qualities. — The *white* is inodorous and insipid, of a glary viscid nature, readily dissolving in water, coagulable by a heat of 165° Fahrenheit, and also by acids and alcohol. When coagulated it becomes sapid, and is no longer soluble either in cold or hot water. From the experiments of Dr. Bostock, it appears to be composed of water 85·0, albumen 1·2, in 100 parts; and besides shows traces of uncoagulable matter 2·7, and salts 0·3, sulphureted hydrogen gas, and benzoic acid. The *yolk* is also inodorous, but has a bland oily taste; and when agitated with water forms a milky emulsion. When boiled it becomes a granular solid, and yields by expression a yellow insipid fixed oil. It consists of four constituents, water, oil, albumen, and gelatine; on the presence of the albumen depends the hardness of the boiled yolk. The *shell* consists of carbonate of lime, phosphate of lime, and animal mucus. When it is burnt, the carbonic acid is dissipated, the animal cement destroyed, and pure lime, with phosphate of lime, obtained. As long as the yolk remains suspended in the centre of the albumen, an egg is supposed to be good; but it spoils as soon as the yolk touches the shell. The preventing the admission of air, through the pores of the shell, preserves eggs for a longer period than they otherwise could be kept good. This is effected by covering the egg with grease, or dipping it into lime water. A fresh or good egg appears semi-transparent, when placed between the eye and the light: but when it is opaque or irregularly cloudy, it must be rejected.

Medical properties and uses. — The yolks of raw eggs are gently laxative, and have been thought serviceable in jaundice and other hepatic obstructions. Beaten up with sugar and wine, they are extremely nutritive, and are consequently useful in convalescencies, and other cases of debility. In pharmaceutical operations the yolks are used for rendering oil and balsams miscible with water; and the whites for clarification.[2] The shells are antacid; but possess no advantages over chalk when unburned, or lime when they are burned.

PHYSETER. *Syst. Nat. Gmelin.* i. 227.

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[1] Hens have been known to lay eggs when twenty years old. *Supplement to Latham*, 207.

[2] Owing to peculiar idiosyncrasy, the smallest portion of the white of egg cannot be eaten by some persons without occasioning pain, sickness, and an erysipelatous eruption on the skin.

Cl. 1. *Ord.* 7. Mammalia Cete.
G. 39. *Teeth* in the lower jaw, but none in the upper. *Tube* in the head or great front.
Species 2. P. *Macrocephalus.* Spermaceti Whale. *Willough. Pisc. t.* A. 1. *f.* 3. *Phil. Trans.* lx. 321. *t.* 9.
Officinal. CETACEUM. *Lond.* SPERMACETI. *Edin.* SPERMA CETI; SEVUM. *Dub.* Spermaceti.

Syn. Spermaceti; Cétine (*F.*) Wallrath (*G.*) Spermaceti (*I.*) Espermaceti (*S.*)

This species of whale inhabits chiefly the Southern Ocean, although some are occasionally seen in the European seas. It is a large fish, generally measuring about sixty feet in length, and thirty in circumference at the thickest part of the head, which is blunt, and about nine feet in height. It is of a blackish colour on the upper part of the body, and white on the belly. There are 46 double teeth in the lower jaw, which is shorter than the upper; and in the head is a triangular bony cavity covered by the common integuments only, and filled with an oily fluid, which, on the death of the fish, congeals into a spongy mass. The eyes are small: the pectoral fins near the angles of the mouth; and the tail forked.

The spongy oily mass is dug out from the cavity of the head, and the oil separated from it by dripping.[1] In this state it has a yellow unctuous appearance, and is brought to England in barrels. The following is the mode of purifying it in the great way: The mass is put into hair bags, and pressed between plates of iron, in a screw press, until it becomes hard and brittle. It is then broken in pieces, and thrown into boiling water, where it melts, and the impurities rising to the surface are skimmed off. After being cooled, and separated from the water, it is put into fresh water in a large boiler, and a weak ley of the potash of commerce added to it by degrees. This part of the process is thrice repeated, after which the whole is poured into coolers, where the spermaceti concretes into a white semitransparent mass, which, on being cut into small pieces, assumes the flaky aspect it has in the shops.[2]

Qualities. — Purified spermaceti is a white, crystallized, friable, semitransparent, unctuous substance, nearly inodorous and insipid. Its specific gravity is 9·433. It melts at 112° Fahrenheit[3]; and at a higher temperature evaporates, very little altered; although by repeated distillations it is partly decomposed, and a brown acid liquor obtained. Like the fixed oils it leaves, when heated, on paper, a greasy stain, and can be diffused in water by means of the yolk of egg or mucilage. It is soluble in hot alcohol, ether, and oil of turpentine, but concretes again as the fluids cool; and is completely soluble in the fixed oils. When boiled with alcohol, it becomes fusible at 49°, more brilliant and less unctuous, less odorous, and more soluble in alcohol.[1] Of the acids, the sulphuric only acts on it, dissolving it, and forming a dark-coloured, thick, soapy, solution, which has a faint smell of sulphur. The alkaline carbonates do not affect it, but it is partially dissolved in the pure alkalies; and with hot ammonia it forms an emulsion, which is not decomposed by cooling. Long exposure to hot air renders it rancid; but it may be again purified by being washed in a warm ley of potash.

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[1] An ordinary sized whale will yield upwards of twelve large barrels of crude spermaceti.

[2] *Monthly Magazine,* August 1809.

[3] Bostock, *Nichol. Journ.* iv. 134.

Medical properties and uses. — Spermaceti is demulcent and emollient. It however possesses no advantages for internal use over the fixed bland oils. It is used in dysentery and irritations of the alimentary canal, and in catarrh and phthisis: but in the latter cases it is less beneficial than the bland oils; for, as these are readily united with water by means of alkalies and mucilages, the compounds formed with them are more viscid, and better adapted for smearing the fauces. Several imaginary healing virtues were formerly supposed to belong to spermaceti; on which account it was, and still is, often given to women in child bed. It is, however, when combined with water by means of the yolk of egg, a pleasant vehicle for tincture of opium, when the after-pains are troublesome. It forms a part in the composition of several ointments.

The dose is from ʒſs to ʒjſs rubbed with sugar, or in the form of emulsion.

Offi. preparations. *Ceratum Cetacei.* L. *Unguentum Cetacei.* L. D.

PIMPINELLA. *Spec. Plant. Willd.* i. 1471.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 562. *Fruit* ovate-oblong. *Petals* inflected. *Stigma* nearly globular.

Species 8. Pimpinella *Anisum*. Anise. *Med. Bot.* 2*d edit.* 135. *t.* 52.

Officinal ANISI SEMINA. *Lond.* PIMPINELLÆ ANISI SEMINA. *Edin.* ANISUM; SEMINA. *Dub.* Anise seeds.

Syn. Graines d'Anis (*F.*) Anis (*G.*) Anice (*I.*) Anis; Matalahuga (*S.*) Ancessoon (*Arab*.) Souf (*H.*)

This is an annual plant, a native of Egypt; but cultivated abundantly in Malta, and Spain, and in our physical herb gardens[2]; flowering in July. It is a delicate plant, and rises about a foot only in height. The stem is striated, smooth, jointed, and branching: the lower leaves are roundish, lobed, and toothed; but the upper ones are divided into narrow pinnated segments: the flowers are small and white, in flat terminal umbels, without involucres: the seeds are oblong, swelling, striated, and of a greenish colour.

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[1] Chevreul, *Ann. de Chim. et de Phys.* tom. vii. p. 157.

[2] A considerable quantity is cultivated at Mitcham in Surry, chiefly for the use of the rectifiers of British spirits. *Stevenson's Survey*, 379.

The anise grown in this country ripens its seed sufficiently to be gathered about the middle of August. A greater quantity of seed, however, than is grown here, is annually imported from Malta and Spain. The Spanish is small, and generally preferred.

Qualities.—Anise seeds have an aromatic odour, and a sweetish, warm, grateful taste. Both alcohol and water extract their virtues; and in distillation with water they yield a yellowish volatile oil, which concretes at a temperature of 50° of Fahrenheit. An oil of a greenish colour also is obtained from anise seeds by expression; it consists of a bland fixed inodorous oil, mixed with a large portion of the proper essential oil.

Medical properties and uses.—These seeds are carminative; and are supposed to possess the power of promoting the secretion of milk. They are chiefly used in flatulencies, and in the tormina of infants. They are given in substance bruised, in doses of from grs. x to ʒij.

Officinal preparations. *Oleum Anisi.* L. E. D. *Spiritus Anisi.* L.

PIMEN'TÆ BAC'CÆ. Vide *Myrtus.*

PINUS. *Spec. Plant. Willd.* iv. 494.

Cl. 21. *Ord.* 8. Monœcia Monadelphia. *Nat. ord.* Coniferæ.

G. 1711. *Male. Calyx* four-leaved. *Corolla* none. *Stamens* many. *Anthers* naked.

Female. Calyx strobiles, with a two-flowered scale. *Corolla* none. *Pistil* one. *Nut* with a membranous wing.

* *with double leaves.*

Species 1. P. *sylvestris.* The Wild Pine, or Scotch Fir. *Med. Bot. 2d ed.* 1. *t.* 1. *Smith Flora Brit.* 1031. *Lambert, Description of the Genus Pinus,* i. *t.* 1.

**** *with fascicled leaves.*

Species 24. P. *Larix.* The Larch. *Med. Bot. 2d edit.* 7. *t.* 4. *Lambert,* 53. *t.* 35.

***** *with solitary leaves, distinct at the base.*

Species 27. P. *Balsamea.* Balm-of-Gilead Fir. *Lambert,* 48. *t.* 31.

Species 32. P. *Abies.* Norway Spruce Fir. *Med. Bot. 2d ed.* 4. *t.* 2. *Lambert,* 37. *t.* 25.

1. THE SCOTCH FIR.

Officinal. α. TEREBINTHINA VULGARIS. *Lond. Edin.* TEREBIN'THINA VULGARIS; RESINA. *Dub.*

β. TEREBIN'THINÆ OLEUM. *Lond.* PINI OLEUM VOLATILE. *Edin.*

γ. RESINA FLAVA. *Lond.* RESINA PINI. *Edin.* RESINA ALBA. *Dub.* RESINA NIGRA. *Lond.*

δ. PIX LIQ'UIDA. *Lond. Dub.* RESINA EMPYREUMATICA, VULGO PIX LIQUIDA. *Edin.*

Common Turpentine. Oil of Turpentine. Resin. Black Pitch. Tar.

Syn. α. Térébinthe (*F.*) Gemeiner Terabenthin (*G.*) Trementina (*I.* & *S.*) β. Huile. essentialle de Térébinthe (*F.*) Terbenthinöhl (*G.*) Olio della Trementina (*I.*) Azeyte de Trementina (*S.*) γ. Resine blanche et flave (*F.*) Fichtenharz (*G.*) Ragia (*I.*) Resina (*S.*) δ. Goudron (*F.*) Theer (*G.*) Pece liquida (*I.*) Brea (*S.*)

The wild pine, or Scotch fir, so named from its growing wild on the Scotch mountains[1], is common in most of the northern parts of Europe. It is a straight, abruptly-branched tree, rising in a favourable soil to the height of eighty feet, covered with a rough, cracked, brownish-coloured bark, and always clothed with foliage. The leaves are short, linear, entire, pointed, concave on one side, and convex on the other, about two inches long, of a bright green colour, and issuing in pairs from a white truncated sheath: the flowers are white: the *male catkin* is densely spiked, bracteated, elliptical, obtuse, with numerous scales crested on the upper side, but on the under bearing a sessile anther: the *female* is inferior, often ternate, or three together round the branches, peduncled, smooth, of a green colour, and changes into a small, nearly pointed, conical strobile or cone, which appears tessellated and warty, and bears within each scale two winged seeds.[2]

This tree is at its perfection when between seventy and eighty years old; but it yields turpentine at the age of forty. Those trees which are most exposed to the sun, and have the thickest bark, afford it in the greatest abundance. The operations for procuring it commence in the month of May: the outer bark is stripped off for six inches, so as to expose the inner smooth bark, near the foot of the tree, and a wound made with a sharp tool three inches square, and an inch deep. The resinous juice soon begins to exude in transparent drops, which fall into a hole previously dug at the foot of the tree: fresh incisions are successively made till September, when the cold checks the further exudation. The warmer the weather is, the greater quantity of turpentine is obtained: and a healthy tree may thus yield from six to twelve pounds of turpentine annually, for a century of years. Part of the juice concretes in the wounds, and is called *galipot* in Provence, and *barras* in Guienne; but although it contains oil, yet it is not used for the purpose of procuring it. The proper turpentine is purified by being exposed to liquefy in the sun's rays in barrels perforated in the bottom, through which it filters.

The *oil of turpentine* is obtained by distilling the resin with water in a common still, when the oil is found in the receiver swimming on the water, from which it is easily separated: the average proportion is 60lbs. of oil from 250lbs. of good turpentine. This process is carried on both abroad and at home; but the oil drawn in this country is always preferred.

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[1] When Cæsar asserted that the fir did not grow in Britain, he must have meant the *P.* Abies. The ancient name of the fir in Scotland was *Gius*, in Ireland *Giumhus*, and in Wales *Fynniduydh*. It prefers an arid siliceous soil.

[2] Essence of spruce is a fluid extract prepared by coction of the twigs; which, when fermented with sugar or molasses and water, forms spruce beer.

Common resin, or *yellow resin*, is the residue of the distillation of turpentine. It receives different appellations according to the mode in which the process is carried on. When the distillation is performed without addition, and continued to dryness, the residue is called *common resin*, or *colophony*[1], but when agitated with about one-eighth of fresh water while yet fluid, it is named *yellow resin*. A similar resin is made by melting and agitating the *galipot* in water; and this is preferred in general to the former kind, on account of its greater ductility, which arises from its containing a portion of oil.

Tar[2] is the last officinal preparation from this species of fir which we have to notice. The greater part of the tar imported into Britain is brought from the Baltic, and is still prepared in nearly the same method as is described by Dioscorides to have been practised by the ancients. The branches of the trees are cut into billets, and piled up in large stacks which are covered with turf. Fire is then applied to the wood, and it is suffered to burn with a slow smothered flame, during which the tar is formed by the decomposition of the resinous juice, flows to the bottom, and runs out through a small channel cut for the purpose. The stacks are generally built on the slope of a hill, so that the tar is easily collected, and put into barrels; in which state it is brought to this country.

2. THE LARCH TREE.

Officinal. α. RESINA LIQUIDA, *vulgo*, TEREBINTHINA VENETA. *Edin.* TEREBINTHINA VENETA; RESINA. *Dub.*

β. PINI OLEUM VOLATILE. *Edin.*

Venice Turpentine; Oil of turpentine.

Syn. Térébinthe de Venise (*F.*) Venetischer Terbenthin (*G.*) Trementina Veneta (*I.*)

There are two varieties of the larch tree, one of them a native of America, the other of the south of Europe and Siberia.[3] It rises erect to the height of fifty feet, sending off slender spreading branches, which droop at their extremities. The leaves are deciduous, soft, and of a bright green colour; in tufts generally containing forty or more, springing from short, thick corrugated sheaths, and spreading like a painter's brush; linear, somewhat obtuse, and entire: the male flowers, which appear in April, are in small lateral, cylindrical catkins, with the apexes of the anthers inflated; the female are in erect ovate catkins, twice as large as the male, and in some instances purple at the top: the strobiles or cones are about an inch long, obtuse, and purplish at the apex, with the scales smooth on the surface, lacerated at the edges, and concealing under each two winged seeds.

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[1] The colophonia of the ancients was a liquid resin, named from Κολοφων, a town of Ionia in Asia Minor, whence it was brought.

[2] Κωνον Græcorum.

[3] The larch tree has been cultivated in England since 1629. *Hort. Kew.*

The larch tree grows to very great perfection in the forests of Baye in Provence, where a very large proportion of the Venice turpentine of commerce is procured. It is obtained by boring a hole with an auger into the heart of the tree, at about two feet from the ground, and fitting into it a small pipe, through which the turpentine flows slowly into vessels placed for its reception. This process is begun in May, and continued till September; when the different quantities collected are put together, and purified by straining through cloths or hair sieves. No trees under twelve inches in diameter are tapped; but vigorous trees will yield annually seven or eight pounds for forty or fifty successive years, or during the term of their life.[1] Much of the Venice turpentine of the shops is brought from America; and is perhaps procured from a different species of fir.

The *essential oil* is separated from it by distillation in the same manner as from the common turpentine.

3. BALSAM OR BALM-OF-GILEAD FIR.

Officinal. TEREBINTHINA CANADENSIS. *Lond.* BALSAMUM CANADENSE.[2] *Dub.* Canada Turpentine. Canada Balsam.

Syn. Kanadischer balsam (*G.*)

This tree is a native of North America, flowering in May. It is a straight elegant tree, covered with a smooth whitish-gray bark. The leaves are in double rows like a comb, short, and linear, but broader than the former two species, and less pointed; of a dark green colour on the upper surface, marked with whitish lines underneath, and fragrant: the cones, which ripen in October, stand erect on the branches, are large, of a beautiful deep glossy purple colour, inclining to black; and exude a great quantity of transparent resin, which gives them a very rich, beautiful appearance.

The manner in which the Canada balsam, or fine turpentine, yielded by this tree is collected, is not well known in this country: but it is probably by simple incisions, as it exists in great quantity in vesicles between the wood and the bark. Canada balsam is brought to this country in casks, each containing about one hundred weight.

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[1] Besides turpentine the larch tree exudes a species of manna, which is named Briançon manna. It is in little white concrete drops, which adhere to the leaves, and tastes sweet like new honey; but it has the flavour of turpentine, which it contains. The inner part of the tree yields also a gum similar in its properties to acacia gum, of a reddish colour, with a slight resinous taste. In Russia it is officinal, and sold, as Pallas observes, under the improper name of Orenberg gum, being obtained from the Uralian Forest. *Flora Rossica*, i. p. 2, 3.

[2] The Dublin college have erred in retaining this name; for, as this substance does not afford benzoic acid, it cannot be ranked as a balsam.

4. NORWAY SPRUCE FIR.

Officinal. α. ABIETIS RESINA. *Lond.* Resin of the spruce fir.
β. PIX ARIDA. *Lond.* RESINA SPONTE CONCRETA, *vulgo*, PIX BURGUNDICA. *Edin.* PIX BURGUNDICA. *Dub.* Burgundy pitch.

The Norway spruce fir is a native of Europe, and of the moist parts of northern Asia; flowering in April.[1] It is a lofty noble tree, rising 150 feet in height; straight, pyramidal, and covered with a reddish scaly bark. The leaves are short, thickly set upon the branches, slightly carinated on both sides, of a dusky green colour, shining on the upper surface, and often curved: the male catkins are ovate, purplish, and scattered in the axils of the leaves; the female are also purple, and generally terminal: the strobiles or cones are long, nearly cylindrical, greenish before they are ripe, but afterwards purple, and always pendent: the scales, which are arranged in eight spiral rows, have an oval shape terminating in a point, and become ragged at the edges.

The *resin* or *thus* of the old London Pharmacopœia exudes spontaneously from the bark of the Norway spruce fir, and concretes as it exudes. It undergoes no preparation, but is brought to us in the form of tears or small masses, packed in casks, each containing from one to two hundred weight. The greater part comes from Germany, but a small quantity of a purer description comes from France.

Burgundy pitch is obtained by making incisions through the bark so as to lay bare the wood. It concretes in the form of flakes at the incisions, which are detached by an iron instrument once a fortnight during the summer, and fresh incisions successively made. The flakes, after being detached, are put into large boilers with a sufficient quantity of water, melted, and then strained through coarse cloths under a press. The greatest quantity is collected in the neighbourhood of Neufchatel, whence it is brought to this country packed in casks. A factitious sort is made in England, and found in the shops under the title of *common* Burgundy pitch. It may be distinguished by its friability, want of viscidity, and unctuosity, and the odour which characterizes the genuine sort.

Qualities.—TURPENTINES. Although these are produced from different species of the pine tribe, and one sort from the Pistacia Terebinthus, yet all of them possess the same general and chemical properties. They have a peculiar somewhat aromatic odour, and a warm, pungent, bitterish taste; are semifluid, tenacious, translucent, combine readily with fixed oils, and are inflammable, burning with a white flame and much smoke. Alcohol and ether dissolve them entirely, leaving the impurities; but water takes up only their flavour. When distilled with water a volatile oil comes over, and resin remains in the retort; the turpentines being compounds of these two substances. But each sort of turpentine has characteristic qualities which require to be noticed: 1. *Common turpentine* has a strong somewhat fragrant odour, and a bitter disagreeable taste; its consistence is greater than that of honey; its colour whitish, and it is more opaque than the other sorts. 2. *Venice turpentine* is more fluid, having the consistence of new honey, a yellowish colour, and is less unpleasant to the smell and taste than the common. 3. *Canadian balsam* (or more correctly *turpentine*) has a strong not disagreeable odour, and a bitterish taste; is transparent, whitish, and has the consistence of Copaiva balsam. 4. *Chian* or *Cyprus turpentine* (see *Pistacia*) is very fragrant, but almost insipid, nearly transparent, thick, tenacious, and of a whitish colour.

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[1] This species of fir is cultivated in Britain, but it does not appear to have been introduced before 1739.

Oil of Turpentine has a strong, penetrating, peculiar odour, and a hot, pungent, bitterish taste. It is perfectly limpid and colourless: extremely light, volatile, and inflammable; and dissolves completely in six parts of sulphuric ether; but although hot alcohol readily dissolves it, yet it again separates in drops as the spirit cools, and is very sparingly soluble in the cold in the strongest alcohol. In all other respects it agrees with the other essential volatile oils. A stream of oxymuriatic gas passed through it converts it into a yellow resin.

Tar has a strong odour familiar to every body; a resinous, subacid, bitterish taste; and a coarse thick consistence, with a deep brown colour approaching to blackness, derived from the charring of the wood during its formation. It consists principally of empyreumatic oil, resin, and acetic acid; is partially soluble in water; and inspissated by boiling into pitch.

Yellow and *White resin* are varieties of the same substance. They are nearly inodorous when cold, but heated emit a slight terebinthinate odour. Their taste is slightly acrid and bitterish; and the colour a dull whitish yellow, or a greenish yellow. The mass of resin is semipellucid, brittle, breaks with a true vitreous fracture, and adheres moderately to the fingers. Its specific gravity is 1·0742. It melts when heated, then inflames, and burns with a yellow flame giving out much smoke. It is insoluble in water, but entirely soluble in alcohol, ether, the fixed oils, and the alkalies. The acids also dissolve resin, and convert it into artificial tannin; with the exception of the acetic acid, which only dissolves it. When sulphuric acid is employed, charcoal, in the proportion of 43 per cent. of the resin acted on, is produced.[1] The *resin of the Norway spruce* possesses nearly the same properties. It is solid, brittle, in tears, of a brownish yellow colour on the outside, and internally white; and emits a very agreeable odour when burning.

Burgundy pitch has a terebinthinate odour and taste, is brittle, opaque, and of a light yellow, or reddish-brown colour. It softens moderately in the heat of the hand, appears unctuous, and has a considerable degree of tenacity.

Medical properties and uses. The *turpentines* and their *essential oil* are stimulant, cathartic, diuretic, and anthelmintic; and externally rubefacient. Of those which I have described, the Venice and Canada turpentines are more generally employed for internal purposes; the common turpentine proving offensive to most stomachs, and the Chian not being easily procured. The ancients were well acquainted with the medicinal properties of turpentines[2]; and, besides the diseases for which they are prescribed by the moderns, gave them liberally in coughs and all pulmonary affections. Turpentines seem to derive their virtues from the oil they contain. When swallowed, they produce a sensation of warmth in the stomach, increasing the quickness and force of the pulse; and if the dose be large, some degree of nausea is excited, with slight vertigo, and soon a copious discharge from the bowels; but if small, they act chiefly upon the kidneys. The cathartic operation of large doses of the oil, in particular, seems to counteract the determination to the kidneys, which smaller doses produce; for in doses of even fʒx and fʒxij, no other effect on the urinary organs is perceived than the violet smell of the urine.[3] The odour of violets is produced by the oil, even when it is not taken into the stomach, or rubbed upon the skin; for if a quantity of oil of turpentine be poured on a table in a room, this odour will be perceived in the urine of any one who remains in the room for half an hour, or even a shorter time. Turpentines are chiefly prescribed in gleet, leucorrhœa, mucous obstructions of the urinary passages, and calculous affections; but in the latter cases their stimulant operation on the kidneys requires that they be given with caution. The oil is regarded as a useful remedy in lumbago, sciatica, and some other varieties of chronic rheumatism, particularly when combined with the cinchona bark; and it has lately been very successfully given in unusually large doses for the expulsion of the tape-worm. It differs in its action from the other remedies which have been employed against tape-worm, by killing the worm before it throws it out; and thence promises to be more permanently useful.[1] As local stimulants, turpentines and the oil have been efficaciously exhibited in the form of enema, in cases of colic, obstinate costiveness, and ascarides. The oil is useful when dropped into the ear in deafness from defect of wax; and is an excellent addition to embrocations in acute rheumatism, bruises, and paralysis of the extremities. As a discutient it is applied to indolent tumours, and is a useful primary application to burns.

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[1] Hatchett, *Phil. Trans.* 1806.

[2] *Dioscor.* lib. i. cap. 91. p. 50.

[3] *Transactions of the London Medical Society*, i. part 1. 212. 227.

Turpentines are given in doses of grs. x to ℥j, either made into pills with powdered liquorice root, or diffused in water by means of almonds, mucilage, or yolk of egg. The dose of the oil may be ♏ x to ʒj, to produce its diuretic effect; but for the expulsion of tænia it is necessary to give from f℥ss to f℥ij, repeated every eight hours till the worm is thrown out. In these large doses it is more easily taken when exhibited uncombined.

Tar is stimulant, diuretic, and sudorific; and externally detergent. For its internal use see *Aqua Picis liquidæ* among the Preparations. As an external application it has been found beneficial in porrigo scutulata, foul ulcers, and some other cutaneous diseases.

The *resins* and *Burgundy pitch* are adapted for external use only; the former entering into the composition of some ointments and plasters; the latter being used as a rubefacient plaster. It excites some degree of inflammation, and a serous exudation from the part over which it is applied, without raising the cuticle. It is used in cases of catarrh, pertussis and dyspnœa; and seems to be chiefly serviceable from the length of time its action can be continued.

Officinal preparations. Of turpentine—*Oleum Terebinthinæ*. D. Of the oil—*Linimentum Terebinthinæ*. L. Of yellow resin—*Emplast. Resinæ*. L. E. D. *Ceratum Resinæ*. L. E. Of Burgundy pitch.—*Emplast Picis. comp*. L. E. Of tar—*Aqua Picis liquidæ*. D. *Unguentum Picis liquidæ*. D.

PIPER. *Spec. Plant. Willd*. i. 159.

Cl. 2. *Ord*. 3. Diandria Trigynia. *Nat. ord*. Piperitæ *Lin*. Urticæ *Juss*.

G. 74. *Calyx* O. *Corolla* O. *Berry* one-seeded.

Sp. 1. P. *nigrum*. Black Pepper. *Med. Bot. 2d ed*. 721. *t*. 246. Melago codi. *Rheede Hort. Malabar*. vii. 23. *t*. 12. *Marsden*. p. 105.

Sp. 12. P. *longum*. Long Pepper. *Med. Bot. 2d ed*. 724. *t*. 247. Cattu-tirpali. *Rheede Hort. Malabar*. vii. 27. *t*. 14.

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[1] In all the cases of the expulsion of tænia by oil of turpentine, the ejected worm has generally had a livid hue, without any appearance of animation.

1. PIPER NIGRUM.

Officinal. PIPER NIGRI BACCÆ *Lond.* PIPERIS NIGRI FRUCTUS. *Edin.* PIPER NIGRUM; BACCÆ SEMEN. *Dub.* Black Pepper.

Syn. Poivre (*F.*) Schwarzin Pfeffer (*G.*) Pepe nero (*I.*) Pimienta (*S.*) Fulful. filfil (*Arab.*) Mirch (*H.*) Maricha (*San.*)

This species of pepper is a native of the East Indies; and is very abundantly cultivated at Malacca, Java, and Sumatra, whence the whole of Europe is supplied. It is a climbing plant, the stem being round, smooth, jointed, and swelling towards each joint, woody, slender, branched, and from eight to twelve feet in length. The leaves are petiolate at the joints of the branches, ovate, entire, pointed, seven-nerved, and of a dark green colour: the flowers are sessile, white, small, and placed on terminal spikes; without any regular calyx or corolla: the filaments are flat, awl-shaped; and the anthers roundish: the germen is ovate, crowned with three rough stigmas: the fruit is a globular berry of a red-brown colour.

In Sumatra the pepper vines are propagated by cuttings or suckers. In growing they are supported by props called *chinkareens*, which are cuttings of Morinda *citrifolia*, or of Erythrina, and at the root of each of which two vines are planted. The plants are three years old before they bear fruit, and bear for eight years. The berries are four or five months in coming to maturity; are gathered as soon as any of them ripen; and then spread upon mats to dry, and trodden to separate the fruit from the stalk; when they become black, and more or less shrivelled. The vines yield two crops yearly; the first in December, the second in July. White pepper is the ripe and perfect berries, freed of their outer coat by means of a preparation of lime and mustard oil, called *chinam*, applied before it is dried. The pepper is now also cultivated to a considerable extent in India.[1]

Qualities.— Black pepper has an aromatic odour, and a hot pungent taste. Its virtues are entirely extracted by ether and alcohol, and partially by water. The aqueous infusion is brown, and reddens vegetable blues; and the decoction of the ground pepper forms a precipitate with infusion of galls, which dissolves again when the fluid is heated to 120°. When the alcoholic infusion is distilled, a green, resinous, oily matter is left, which appears to be the source of the odour and taste of the pepper. The principal constituents are starch, the above oily matter, and extractive.[2] Ether digested on powdered pepper takes up three parts in ten; and when evaporated on water deposits an intensely hot, biting, yellowish resin, with the odour of the pepper, and an insipid extractive matter.

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[1] Dr. Roxburgh began the cultivation of black pepper in the Circars in 1787. The prop trees he used were the Moochy wood tree, Erythrina Corallodendron. One thousand plants yield from 500 lbs. to 1000 lbs of pepper.

[2] *Thomson's Chemistry*, 4th ed. vol. v. 266.

Medical properties and uses. — Black pepper is stimulant and carminative. Its use as a condiment is well known; and although in general it is not hurtful, but rather useful to those who have a weak digestion, yet, even in small quantities, it proves injurious in inflammatory habits, and to those subject to piles. As a medicine, pepper is found sometimes serviceable in checking nausea and vomiting, and removing hiccough. It is also used as a stimulant in retrocedent gout, and in palsy. The watery infusion forms a useful gargle in relaxation of the uvula.

The dose of black pepper may be from grs. x to ℈j.

Officinal preparation. *Unguentum Piperis nigri.* D.

2. PIPER LONGUM.

Officinal. PIPERIS LONGI FRUCTUS. *Lond. Edin.* PIPER LONGUM; FRUCTUS. *Dub.* Long Pepper.

Syn. Poivre longe (*F.*) Langer Pfeffer (*G.*) Pepe lungo (*I.*) Pimienta larga (*S.*) Darfilfel (*Arab.*) Pipel (*H.*) Tipilīe (*Tam.*) Pipāli (*San.*)

This plant is a perennial, a native of Malabar and Bengal. The stems are round, smooth, branched, slender, and scandent: the leaves are commonly cordate, pointed, nerved, and of a deep green colour: the flowers are small, in dense short terminal spikes, nearly cylindrical. In other circumstances the fructification agrees with the former species. The fruit consists of very small berries or grains imbedded in a pulpy matter.

The fruit is hottest in its immature state, and is therefore gathered while green, and dried in the heat of the sun. It comes in the entire spikes, which are about one inch and a half long, and indented on the surface.

Qualities. — Long pepper has a weak aromatic odour, an intensely fiery pungent taste, and a dark grey colour. Its constituents appear to be similar to those of black pepper. Ether digested on powdered long pepper takes up two parts and a half in ten parts, and when evaporated on water deposits a resin less hot than that of black pepper, but more permanent and a smaller proportion of extractive.

Medical properties and uses. — These are in every respect the same as those of black pepper.

PISTACIA.[1] *Spec. Plant. Willd.* iv. 752.

Cl. 22. *Ord.* 5. Diœcia Pentandria. *Nat. Ord.* Amentaceæ *Linn* Terebintaceæ *Juss.*

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[1] *Πιστακια* Dioſcoridis.

G. 1782. *Male. Calyx* five-cleft. *Corolla* 0. *Female. Calyx* three-cleft. *Corolla* 0. *Styles* three. *Drupe* one-seeded.

Species 4. P. *Terebinthus.* Chian Turpentine tree. *Med. Bot. 2d edit.* 29. *t.* 12. *Du Hamel Arbres,* ii. *t.* 87.

Species 6. P. *Lentiscus.* Mastich tree. *Med. Bot. 2d edit.* 26. *t.* 11. *Du Hamel Arbres,* ii. *t.* 136.

1. PISTACIA TEREBINTHUS.

Officinal. TEREBINTHINA CHIA. *Lond.* Chian Turpentine.

Syn. Térébinthe de Chio (*F.*) Zyprischer Terebinthin (*G.*)

The tree which yields the Chian turpentine is a native of Barbary and the south of Europe. It is cultivated in the islands of Chios and Cyprus, and also bears the severity of our climate; it is cultivated here as an ornamental tree, flowering in June and July; is low in stature, sending off many spreading branches, and is covered with a smooth bark: the leaves are pinnate, composed of three pair of lanceolate ovate veined, entire leaflets, with a terminal one: the male and female flowers are on different trees. The *male* are in an amentum, with the calyx divided into five small ovate segments; the filaments four or five in number, very short, and supporting large, brown, erect, quadrangular anthers. The *female* are placed on a common peduncle in alternate order; consisting of a calyx of three small squamous segments, and an ovate germen crowned with two or three styles, with reflected clubbed stigmas. The fruit is subovate, reddish, smooth, and gibbous towards the top on one side.

The turpentine is gathered chiefly in Chio by making incisions in the bark of the trunk in the month of July. It is allowed to flow upon stones placed at the bottom of the tree, and after being condensed by the cold of the night, is scraped off the following morning before sun-rise. It is then reliquefied by the sun's heat, and strained to free it from any extraneous matter, and in this state is imported into this country in casks. On account of its high price it is often mixed with common turpentine.

Qualities. — Chian turpentine has a fragrant odour, a moderately warm taste, devoid of acrimony or bitterness; and a white or very pale yellow colour: it has the consistence of thick honey, is clear, transparent, and tenacious; and in its other qualities, as well as in its medicinal properties, resembles the other turpentines. See *Pinus.*

2. PISTACIA LENTISCUS.

Officinal. MASTICHE.[1] *Lond.* PISTACHIÆ LENTISCI RESINA. *Edin.* Mastic.

Syn. Mastic (*F.*) Mastix (*G.*) Mastice (*I.*) Almastiga; Almaciga (*S.*)

The lentisk, or mastich tree, is a native of the Levant, flowering in May, and ripening its fruit in August.[1] It is a low tree, seldom exceeding twelve feet in height, and eight inches in thickness; is covered with a smooth brown bark; and towards the top sends off numerous branches: the leaves are abruptly pinnate, consisting of five or six opposite pairs of narrow ovate leaflets, of a lucid green colour on the upper, and pale on the under side, sessile on the common footstalk, which has a narrow foliaceous membrane or wing on each side running from one pair of leaflets to the other. The flowers resemble those of the former species: the fruit is a drupe, containing an ovate smooth nut, of a brownish colour when ripe.

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[1] Σχινος Dioscoridis.

Mastic is most abundantly obtained in the island of Chios. Incisions are made in the trunks and branches of lentisk trees from the 15th to the 20th of July, from which the mastic slowly exudes, some dropping on the ground, which is made smooth and hard as a pavement for the purpose of receiving it; and some remaining fixed on the trees, and hardening so as to require for its detachment the aid of a sharp iron chisel. It is not gathered until August, when fresh incisions are made, and a second gathering takes place about the middle of September: no more incisions are made this year, but the gathering is continued twice a week until the 19th of November.

The low trailing lentisks yield the finest mastic, and in the greatest quantity. Chios exports annually about 1508 cwts.[2], part of which is brought to this country packed in chests.

Qualities. — Mastic is almost inodorous, unless when rubbed or heated, when it exhales an agreeable fragrant odour. It is nearly insipid; and when chewed, at first crumbles, feeling gritty between the teeth, but by degrees becomes soft and white. Ether dissolves it entirely, but in alcohol about one fifth remains undissolved, which has, when moist, the characters of caoutchouc[3], but becomes brittle when dried; and therefore appears to be a peculiar vegetable principle. In other respects it resembles the pure resins; and perhaps contains a small portion of essential oil.

Medical properties and uses. — Mastic has generally been regarded as astringent and diuretic, and ordered for the same diseases as turpentine; but its virtues, if it has any, are very trifling. The wood and leaves of the lentisk were used by the ancients in fluor albus and ulcerations of the uterus; and the

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[1] It appears to have been cultivated in Britain so early as 1664. But it never attains here any degree of perfection.

[2] *Olivier's Travels*, (translation) ii. 90. Olivier says, a soft mastic having all the qualities of mastic, except in its consistence, which is that of turpentine, is procured by engrafting the lentisk on the Chian turpentine tree.

[3] *Crell's Annals*, 1794, ii. 185. *Thomson's Chemistry*, 4th edit. vol. v. 93.

Turkish and Armenian women use the resin as a masticatory for cleaning the teeth, and giving an agreeable smell to the breath. It is employed to fill the cavities of carious teeth.

PIX ARIDA. Vide *Pinus Abies.*

PIX LIQUIDA. Vide *Pinus sylvestris.*

PLUMBUM. *Edin.* Lead.

Syn. Plomb (*F.*) Blei (*G*). Piombo (*I*). Plomo (*S*). Soorb (*Pers.*) Anuk (*Arab.*) Sisa (*H.*) Ecum (*Tam.*) Sisaca (*San.*)

This is a metal of a blueish grey colour, occurring in great abundance in most countries of both hemispheres of the globe, in primitive, transition, and floetz formations. It is found,

A. in its metallic state:

1. Sulphuretted.	Sp. 1. *Galena.*
	Var. *a.* Common.
	b. Compact.
	2. *Blue lead ore.*
a. and combined with antimony.	3. *Antimonial Sulphuret.*
B. united with oxygen:	
	4. *Earthy lead ore.*
	Var. *a.* Coherent.
	b. Friable.
	5. *Native minium.*
b. and combined with carbonic acid.	6. *Carbonate of lead.*
	7. *Black lead ore.*
c.——with muriatic acid.	8. *Murio-carbonate of lead.*
d.——with phosphoric acid.	9. *Phosphate of lead.*
	Var. *a.* Brown lead ore.
	b. Green lead ore.
e.——with chromic acid.	10. *Chromate of lead,* or *Red lead of Siberia.*
f.——with sulphuric acid.	11. *Sulphate of lead.*
g.——with molybdenic acid.	12. *Molybdate of lead.*
h.——with arsenic acid.	13. *Arseniate of lead.*
	Var. *a.* Reniform.
	b. Green arseniate.

Galena is the ore from which metallic lead is commonly procured. When brought up from the mine the ore is broken in pieces, and the impurities, which are mostly iron pyrites, quartz, calcareous spar, and clay, are separated by picking and washing: it is then exposed to a strong heat in a common reverberatory furnace till the sulphur is all separated; after which the metal is brought into a state of fusion; and some spadefuls of lime being thrown in, the scoriæ which are thus rendered solid on the surface of the melted metal are raked to the side of the furnace, while the lead is run out into moulds through an aperture near the bottom; and in this state it is called *pig-lead.* It frequently contains silver, which is separated by oxidizing the lead into litharge, and freeing the silver from what remains by cupellation.

Qualities. — Pure metallic lead is of a light blueish colour, and immediately after being melted or cut has a very considerable degree of lustre, which it quickly loses on exposure to the air. It is nearly insipid, and emits, when rubbed, a peculiar unpleasant odour. It stains the fingers and paper of a blueish colour, and has a specific gravity of 11·352, which is somewhat diminished after it is well hammered.[1] It is the softest and least elastic of the solid metals; and although its ductility be trifling, yet it is very malleable, and may be reduced into thin leaves and drawn into wire: it melts at a temperature of 594[2]; and at a greater heat is volatilized. Its susceptibility of oxidizement is very considerable, and is the cause of its diminished lustre when exposed to the air. According to Dr. Thomson's experiments it is capable of uniting with four doses of oxygen, and forming four distinct oxides, 100 parts of each of which contain the following proportions of lead and oxygen.[3]

Yellow (*protoxide*) contains of lead	91·5.	—oxygen	8·5.
Yellow (*duetoxide*)	90·5		9·5.
Red (*tritoxide*)	88·		12.
Brown (*peroxide*)	80·		20.[4]

Medical properties and uses. — Lead has no action on the animal system in its pure metallic state; but when oxidized, or in combination with acids, it produces very deleterious effects. Hence metallic lead taken into the stomach may prove a poison, from its meeting with acids in the primæ viæ; and liquors which are apt to become in any degree acidulous, if kept in leaden cisterns, may, from the same cause, be productive of much danger to those who drink them. I know an instance of the officers of an East Indiaman having been nearly poisoned from drinking water which was kept in a leaden cistern, and which by the constant agitation of it, from the rolling of the ship, had oxidized the lead; and there have been instances also of plumbers being poisoned by the volatilized particles of lead which in great part form into a grey oxide. But the greater number of cases of poisoning from this metal are produced by the preparation of it we are about to describe; and therefore the mode in which lead acts on the animal system will be more properly noticed under it than in this place.

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[1] Muschenbroeck.

[2] Irvine, *Chemical Essays*, 35.

[3] *Thomson's System of Chemistry*, 4th edit. i. 274—277.

[4] This oxide was first discovered by Proust. Mr. Murray thinks there is reaſon for believing it to be a subsalt. *System of Chemistry*, iii. 266.

1. SUBCARBONATE OF LEAD.

Officinal. PLUM'BI SUBCARB'ONAS. *Lond.* CARBONAS PLUMBI, *vulgo, Cerussa.* Edin. CERUSSA. *Subacetas Plumbi.* Dub. Carbonate of lead. White oxide of lead. Ceruse.[1]

Syn. Plomb carbonaté (*F.*) Bleiweiss (*G.*) Cerussa (*I.*) Blanco de Plomo (*S.*) Isfeedāi (*Arab.*) Sussida (*H.*) Vūllay (*Tam.*)

This substance, which is known in commercial language by the name of *White-lead*, appears, from the analysis of it, by several of the most expert chemists, to be a carbonate of lead.[2] It is prepared in the large way in the following manner:—Sheets of lead about two feet long, five inches broad, and a quarter of an inch thick, cast in a mould and not afterwards flattened, are rolled up into loose coils and placed in earthen pots which are wider at the mouth than at the bottom. Each pot is capable of holding six pints of fluid, but into it as much vinegar only is poured as will rise so high as not to wet the lead, which rests on a ledge half way down. In some manufactories, however, the pots are made to contain about a pint of vinegar only; and the lead, instead of being coiled up, is in form of a simple plate, which is laid over the mouth of the pot. The vinegar and lead being arranged, the pots are buried in fresh stable litter, where they remain for about two months, during which time the vapours of the vinegar elevated by the heat of the dung oxidize the surface of the lead, and the oxide combines with the carbonic acid gas evolved from the fermenting materials of the bed. The carbonate appears as a white, scaly, brittle matter, on the surface of the lead, and is separated " by spreading the coils upon a perforated wooden floor covered with water, and drawing them to and fro by rakes, which detaches the oxide, and causes it to sink through the water and the holes of the floor to the bottom of a vessel placed below.[3] In some places this operation is performed by merely scraping the carbonate off with a knife. It is afterwards ground in mills fitted for the purpose. It was, formerly, ground dry, and the workmen suffered very severely; but it is now ground in water, and the carbonate afterwards dried in earthen pans placed in stoves heated by means of flues. The beauty of the carbonate depends on the purity of the lead.

Qualities.—Carbonate of lead is inodorous, and nearly insipid; in the form of a heavy white powder insoluble in water, but soluble in pure potass. When exposed upon charcoal to the action of the blowpipe, a button of metallic lead is produced. Its constituents, according to Berzelius, are yellow oxide of lead 83·5 and carbonic acid 16·5 in 100 parts.[1] It is often adulterated with chalk, which may be discovered by pouring distilled vinegar on the suspected carbonate, and then adding oxalic acid to the solution. The formation of a precipitate proves the presence of chalk.

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[1] Σανδυξ Dioscoridis.

[2] The various appellations given to this substance by the different Colleges, arise from the indeterminate ideas which prevail of its composition.

[3] *Aikin's Dictionary.*

Medical properties and uses. This preparation of lead is a very powerful astringent. It is used externally only, being sprinkled on inflamed and excoriated parts; and enters into the composition of some ointments.

It is from this preparation that most of the cases of poisoning from the internal use of lead occur. This often happens to painters, and to those employed in grinding white lead, from the want of cleanliness in not washing their hands before eating, by which some of the white lead is introduced into the stomach with their food; and also from the criminal custom of putting white lead, as well as sugar of lead, into acid wines for the purpose of sweetening them, and into hollands to deprive the spirit of the colour which it acquires when long kept in the wood. The symptoms which preparations of lead produce are obstinate costiveness, pain in the stomach, and vomiting; the pulse becomes small and hard; the respiration laborious; and tremors ending in paralysis of the extremities, or death, ensue, when its operation is not counteracted by medicine. The exhibition of cathartics combined with opium or henbane, plentiful dilutions with mucilaginous liquids, the warm bath, and injecting mutton broth per anum, are the best antidotes.

When the presence of any salt of lead is suspected in a dry substance, it may be discovered by reducing it to a metallic state with the blowpipe upon charcoal; and in a liquid, by dropping into it a watery solution of sulphuretted hydrogen gas[2]; when it is made obvious by a dark brown precipitate, which is insoluble in tartareous acid, the salt of lead being formed into an insoluble hydrosulphuret.

Officinal preparations. *Plumbi Superacetas.* L. E. D. *Unguentum Cerussæ.* D.

2. SEMI-VITRIFIED OXIDE OF LEAD.

Officinal. PLUMBI OXYDUM SEMI-VITREUM. *Lond. Edin.* LITHARGYRUM. *Dub.* Litharge.

Syn. Litharge (*F.*) Bleiglätte (*G.*) Piombo semi-vitreo (*I.*) Almartago (*S.*)

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[1] *Annales de Chim.* lxxvii. p. 83.

[2] To prepare this ſolution, put into a phial a paste made of iron filings and sulphur; then after some time add to it a small portion of sulphuric acid, and receive the gas which is produced through a bent tube connected with the phial into a flask filled with distilled water, and inverted in a basin or pneumatic trough full of water.

This oxide is prepared by the simple action of heat and air upon lead. It is generally obtained during the calcination of lead, when separating the silver with which this metal is often combined. The lead is placed in a wind furnace, on a large cupel, or hollow dish made of ashes, and kept at a red heat with the blast of a large pair of bellows directed upon its surface; a scaly yellowish white glistening oxide is soon produced, and successively formed by raking it off and exposing new surfaces till the whole of the lead is thus converted into litharge. The varying of the circumstances of the process varies the colour of the oxide: some kinds of it from having a silvery gloss are denominated litharge of silver; and others, from the colour being a reddish yellow, litharge of gold.

Qualities.—Litharge is inodorous and insipid: it is in flakes with a vitreous lustre, dissolves in many of the acids; and, according to the experiments of Dr. Thomson, 100 parts of it contain 86·9 of lead and 9·1 of oxygen, forming 96 of yellow oxide and 4 of carbonic acid, which, however, does not appear to be essential so as to constitute litharge a subcarbonate of lead. For an account of the action of this oxide on fixed oils see *Plasters.*

Medical properties and uses.—Litharge, like the other preparations of lead, is a powerful astringent. The ancients were acquainted with it. It is never given internally; and is used only for pharmaceutical purposes.

Officinal preparations. *Emplastrum Plumbi.* L. E. D.

3. RED OXIDE OF LEAD.[1]

Officinal. OXIDUM PLUMBI RUBRUM. *Edin.* Red oxide of Lead.

Syn. Minium (*F.*) Mönnige; Mennig (*G.*) Minio (*I.*) Vermillon (*S.*) Isrenj (*Arab.*) Sindar (*H.*) Segāpoo Sindoorum (*Tam.*) Sindura (*San.*)

This preparation is lead in the highest state of oxidizement. It is prepared in a reverberatory furnace, vaulted like a baker's oven, and having two internal walls rising from the floor of the surface, but not reaching to the roof. The coals are placed between these internal walls and the wall of the furnace, by which means the flame is drawn over the top, and reflected from the roof down upon the surface of a quantity of lead placed on the floor. The metal soon melts, and is altogether converted into a yellow oxide, or *massicot*, by successively raking off the pellicles which form on its surface: this is then ground in a mill, and washed to separate any metallic lead, by which it becomes of an uniform yellow colour, and, after being replaced in the furnace, is exposed to the flame while it is constantly stirred for about forty-eight hours, when it is converted into red oxide of lead.[2] By this process, 20 cwts. of lead produce on an average 22 cwts. of red lead, notwithstanding a portion is necessarily volatilized. To save the previous calcination, litharge is sometimes employed.

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[1] Ψιμμυθιον Dioscoridis.

[2] *Watson's Chemical Essays,* iii. 338. *Aikin's Dictionary.*

Qualities.—Red oxide of lead is inodorous and insipid; in the form of a scaly powder, very heavy, its specific gravity being 8·940[1], and of an intense red or scarlet colour, verging into orange: when heated to redness it gives out oxygen gas, and runs into a dark brown hard glass. According to Doctor Thomson's experiments, 100 parts of it contain 88 of lead, and 12 of oxygen.

Medical properties and uses.—Red lead may be applied to the same uses as litharge, but it is now rarely or never used. Its chief use is in the arts, as a pigment.

POLYGALA. *Spec. Plant. Willd.* iii. 871.

Cl. 17. *Ord.* 3. Diadelphia Octandria. *Nat. ord.* Lomentaceæ *Linn.* Pediculares *Juss.*

G. 1313. *Calyx* five-leaved, with two of the leaflets wing-shaped, and coloured. *Legume* obcordate, two-celled.

*** *beardless; herbaceous, with a simple stem.*

Species 67. P. *Senega.* Seneka root. *Med. Bot. 2d ed.* 452. *t.* 162. *Amœn. Acad.* iii. 124.

Officinal. SENEGÆ RADIX. *Lond.* POLYGALÆ SENEGÆ RADIX. *Edin.* SENEKA; RADIX. *Dub.* Seneka root.

Syn. Polygala de Virginie (*F.*) Senegawurzel (*G.*) Poligala Virginiana (*I.*)

This plant is a perennial native of North America, flowering in June.[2] The root is woody, branched, contorted, about half an inch thick, and covered with ash-coloured bark: it sends up several stems a foot in height, erect, slender, round, smooth, and of a dark reddish colour. The leaves are petiolate, alternate, lanceolate, acute, and pale green: the flowers are in loose terminal spikes, small, white, and papilionaceous, with the calyx divided into three narrow persistent segments: the fruit is an inversely cordate capsule, containing several small seeds.

The root is brought from Virginia in bales, each containing from two to four hundred weight.

Qualities.—Seneka root is inodorous: the taste is at first sweetish and nauseous, but after being chewed for less than a minute becomes pungent and hot, producing a very peculiar tingling sensation in the fauces. These qualities reside in the bark; which on the dried root is white within, and covered with a brownish grey, corrugated, transversely cracked cuticle: the central part is white, but woody and inert: alcohol extracts the whole of its active matter, which is precipitated from the tincture by the addition of water; and the ethereal tincture deposits a pellicle of resin, but no extractive. Hot water extracts its virtues partially only; but in a sufficient degree to exert its influence on the animal system.

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[1] Muschenbroeck.

[2] Cultivated in England by Mr. P. Miller, in 1759.

Medical properties and uses. — This root is a stimulating expectorant and diuretic; and in large doses emetic and cathartic: it increases absorption, and consequently augments the natural excretions, particularly that of urine; and frequently occasions a copious ptyalism. It was introduced to the notice of physicians by Dr. Tennant, who, having discovered that it was the antidote employed by the Senagaro Indians against the bite of the rattle-snake, and reasoning from the effects of the poison, and of the remedy in removing these, was induced to try it in pneumonic affections, and found it useful. On account of its stimulant properties, however, it can be employed in these complaints, only after the resolution of the inflammation by bleeding and evacuations. It proves more directly useful in humoral asthma, chronic catarrh, and some kinds of dropsy. The extract of it combined with carbonate of ammonia has been found by Dr. Brandreth, of Liverpool, to be efficacious in some cases of lethargy; and in America the decoction given in divided doses, at short intervals, till it vomits or purges, has been employed with seeming success in croup[1]: it has also been used as a stimulant gargle, in the same disease.

It may be administered either in the form of powder or decoction, combined with aromatics, opium, or camphor, which check its nauseating qualities. Madeira wine, where it can be ordered, may be used to cover the taste of the powder. The dose in substance is from grs. x to ʒj, repeated every three or four hours.

Officinal preparation. *Decoctum Senegæ.* L. E.

POLYGONUM. *Spec. Plant. Willd.* ii. 440.

Cl. 8. *Ord.* 3. Octandria Trigynia. *Nat. ord.* Holoraceæ *Linn.* Polygoneæ *Juss.*

G. 3. *Corolla* five-parted, calycine. *Seed* one, angular.

* * *Bistorts, with a single spike.*

Species 3. P. *Bistorta.*[2] Great Bistort or Snakeweed, *Med. Bot. 2d edit.* 668. *t.* 232. *Smith Flora Brit.* 427. *Eng. Bot. t.* 509.

Officinal. BISTORTA. *Lond.* POLYANI BISTORTI RADIX. *Edin.* BISTORTA; RADIX. *Dub.* Bistort root.

Syn. Bistortt (*F.*) Natter Wurzel (*G.*) Bistorta (*I. S.*)

This plant grows in many parts of Europe, Siberia, and Japan, and is indigenous to Great Britain: found generally in

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[1] *London Medical Review and Magazine*, iii. 426.

[2] Bistorta, *quasi* bis torta, twice twisted. *Alston. Mat. Med.* vol. i. 399.

moist meadows, flowering in May and June.[1] The root is perennial, woody, and tortuous: the stem rises nearly two feet in height, is foliaceous, jointed, swelling at the joints, solid, smooth, and bending a little near the top: the leaves are ovate, those next the root cordato-lanceolate; the whole are entire, waved at the edge, veined, of a fine green colour on the upper surface, and glaucous below; the radical ones are on long winged footstalks, those of the stem almost sessile, amplexicaule, and sheathing. The flowers are small, of a pale rose colour, collected into a close, oblong, terminal spike an inch and a half long; the single flowers standing on short white flower stalks which rise in pairs from membranous, withering, floral leaves. The corolla is divided into five obtuse segments, with nectareous glands at the base: the filaments are longer than the corolla, tapering, and supporting purple anthers: and the germen is triangular, of a red colour, crowned with three long styles, with small round stigmas. The seeds are three-sided, of a dark brown colour, and shining.

Qualities.—The dried root is inodorous, and has a very austere taste. Water extracts its virtues; and the decoction strikes a deep black with oxysulphate of iron.

Medical properties and uses.—The root of bistort is astringent and tonic. It is employed in hæmorrhagies, obstinate fluxes, and all diseases in which simple astringents are indicated. It has also been given in intermittents, combined with Gentian, or Acorus calamus. Externally a strong decoction of it is a useful lotion for spongy gums and ill conditioned ulcers. But it is almost discarded from modern practice.[2]

The dose of the powdered root is from grs. xv. to ʒj, twice or thrice a day.

PORRI RADIX. Vide *Allium Porrum.*

POTASSÆ NITRAS. *Lond.* NITRAS POTASSÆ, *Edin.* NITRUM. *Dub.* Nitrate of Potash. Nitre.

Syn. Nitrate de Potasse (*F.*) Salpetersaures kali (*G.*) Nitro (*I.*) Salitre (*S.*) Shora (*H.*) Yavac Shora (*San.*)

This salt is well known in commerce under the name of salt-petre or nitre. It may be regarded both as a natural and artificial production, being found effloresced on the surface of the soil in some parts of Europe[3], South America,

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[1] It is, however, not confined to low situations, being found on the Carpathian Alps, vegetating under *Pinus magnus*, at an elevation of 4476 feet. Vide *Wahlenberg's Flora Carpatorum.*

[2] In Iceland the recent root of Bistort is eaten raw, or converted into bread. It may, therefore, be reasonably enquired, what effect can it have as a medicine, when prescribed in the small doses usually ordered?

[3] The greatest repository of native nitre in Europe, is the Pulo of Molfelta, in the province of Puglia, in the kingdom of Naples. It is a deep cavity, formed by the

Africa[1], and very abundantly in India[2], whence this country is chiefly supplied; while in some countries, as in Germany and France, it is artificially produced. Nitre is prepared by art by the same means as nature employs, the artificial composts being imitations only of the natural soils where it is most abundantly formed: by giving, therefore, an account of the former mode, both will be better understood. Glauber first suggested the formation of what are termed nitre beds. In France they consist of a compost of putrefying animal and vegetable matters, such as blood, offal, excrementitious matters, and decaying leaves, with street sweepings, old mortar, chalk, and other calcareous matter; which are mixed in casual proportions, and lightly spread in long beds, covered with roofs to protect them from the weather. These are turned up occasionally, frequently moistened with putrid water, or urine; and at the end of two years or less are supposed to be fit to yield the nitre by lixiviation. The theory of this process, which is not yet completely elucidated, was not at all understood till the experiments of Thouvenel and the discovery of the composition of nitric acid by Mr. Cavendish removed much of the obscurity in which it was involved: the following is the explanation. The spontaneous decomposition of the animal and vegetable matter evolves azote, oxygen, hydrogen and carbon, which reuniting by the operation of new affinities, new compounds are formed, and among these nitric acid by the union of the azote or nitrogen from the animal substances with the oxygen from the vegetable matter: the acid thus formed is attracted partly by the calcareous earth of the beds, and partly by a portion of potash, either contained in them ready formed, or, as some have supposed, formed during the process. The presence of a certain degree of heat, and a moderate exposure to atmospheric air, are required, and that of carbonate of lime is absolutely necessary; for, besides fixing the nitric acid when formed, the affinities lime exerts to oxygen and azote favour very much their combination, and consequently the formation of the acid.

The compost when ready to be lixiviated, is first mixed with wood ashes, or with pulverized impure potash, to decompose the nitrate of lime; then put into a cask furnished with a cock at the bottom, and an inner false perforated bottom; a quantity of river water is now poured over it, and after some hours the cock is turned, and the liquor drained off, which is

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falling in of several caverns. The Abbé Fortis first drew public attention to this place, at which time it was lined with a crust of nitre an inch thick, which on being scraped off was successively renewed in a few days.

[1] Near the city of Tlemsan, in the kingdom of Algiers, six ounces of nitre is extracted by simple lixiviation, from one quintal of the common mould.—*Shaw's Travels*, 228.

[2] The presidency of Calcutta exports annually upwards of 3000 tons of nitre.

used instead of water for a second portion of earth; and this is successively repeated till it is supposed to be sufficiently impregnated with the soluble matter of the compost. The lixivium, which contains chiefly nitrate of potash, and the muriates of potash and of soda, is now boiled and clarified with bullock's blood or a solution of glue; and the boiling continued, the muriates as they form being withdrawn by perforated ladles, till the liquor is so concentrated that a few drops poured on cold iron immediately crystallize: it is then, when nearly cold, poured into separate crystallizing dishes, in which after some days the salt is found deposited in a confused mass of opaque dirty white imperfect crystals, which after being broken to pieces and drained, are known under the name of rough or crude nitre.

Nitre is brought from Bengal in an impure state, but crystallized, put up in bags, each containing two Bazar mounds, or 164lbs. weight.[1] The crystallized state of this impure nitre arises from the lixivium of the soil having been slowly evaporated in shaded shallow pits. To purify crude nitre it is repeatedly washed with cold water, which dissolves the deliquescent muriates; and then is boiled with half its weight of water, until a pellicle forms on the surface; after which the solution is poured into leaden coolers, and stirred till it is quite cold, by which means the salt is deposited in acicular crystals.

Qualities.—Pure nitrate of potass is inodorous; and has a bitterish sharp taste, occasioning a sensation of cold both in the mouth and stomach. It is generally in white, pellucid, brittle, hexahedral prisms, terminated by two-sided summits, the specific gravity of which is 1·933. These crystals are soluble in seven parts of water at 60°, producing cold during their solution; but boiling water takes up its own weight of them. They are perfectly insoluble in strong alcohol. They are permanent in the air; melt when exposed to a moderate heat, and when cast into moulds, form sal prunelle. In a strong heat, oxygen gas is disengaged at first, and afterwards azotic gas; and in a continued intense heat the acid is completely expelled and decomposed, leaving behind pure potash. Nitre when mixed with inflammable substances detonates in a strong heat; and if charcoal be used, a pure subcarbonate of potash remains behind. It is likewise decomposed by the sulphuric acid when aided by heat, and in the cold by barytes. According to the analysis of Berard, 100 parts of nitrate of potash contain 51·36 nitric acid, 57·8 potash, and 48·64 of water.[2]

Nitrate of potash sometimes contains muriate and sulphate of soda, and sulphate of potash. The muriate is discovered by nitrate of silver, throwing down a precipitate, every 100 grains of which denotes 42½ of muriate of soda. The sulphates are detected by nitrate of Barytes.[1]

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[1] Each Bengal ship of 800 tons generally brings home in a period of war about 5000 bags of nitre.

[2] *Ann. de Chim.* t. lxxi. p. 69.

Medical properties and uses.—Nitrate of potash is refrigerant and diuretic; and, when externally applied in solution, cooling and detergent. If taken in repeated small doses, it abates heat and thirst in diseases of increased excitement, diminishes the force and frequency of the arterial action, and increases the secretion of urine, in which the salt may be detected by chemical tests. It is efficaciously given in all inflammatory cases, active hæmorrhages, and in herpetic eruptions. Although diuretic, yet it is of little use in dropsies, and is contra-indicated in typhus and hectic fever; in the latter of which, as Dr. Percival has justly observed, it lowers the pulse at first, but afterwards raises it higher than before. A small portion of it allowed to dissolve slowly in the mouth, often removes incipient inflammatory sore throat; and hence its utility in gargles in that complaint.

It is most advantageously given dissolved in mucilaginous fluids, as almond emulsion, in moderate doses not exceeding grs. xv frequently repeated. In large doses it excites nausea; and ℥j given for a dose, which has sometimes occurred by mistake for sulphate of soda, occasions vomiting, hypercatharsis, bloody stools, convulsions, and sometimes death. Opium and aromatics are the best antidotes.

Officinal preparations. *Acidum nitricum.* L. E. D. *Trochisci Nitratis Potassæ.* E.

POTASSÆ SUPERTARTRAS. *Lond.* Vide *Supertartras Potassæ.*

POTA'SSA IMPU'RA. *Carbonas Potassæ impura.* Lond. SUB-CARBONAS POTASSÆ IMPURUS. *Edin.* CINERES CLAVELLATI. *Kali impurum.*[2] Dub. Impure Potash. Impure Sub-Carbonate of Potash. Potashes. Pearl-ashes.

Syn. Carbonate alkalinule de Potasse (*F.*) Koloensuares Kali; Pottasche (*G.*) Potassa del Commercio (*I.*) Mara Ooppio (*Tam.*)

This substance consists chiefly of subcarbonate of potash, mixed with some other salts. It is known in commerce by the name of potash; and is brought to us principally from the Baltic and America. The manipulation of the process by which it is prepared differs in different countries; but the general features of it are every where the same. The dried stems and branches of plants are set fire to, and reduced to ashes; which are lixiviated by pouring over them, in proper vessels, hot or cold water, so as to dissolve the alkaline matter they contain. The impregnated solution, drawn off from the ashes, is then boiled to dryness in iron boilers, and leaves behind a solid saline mass, coloured brown by a small portion of vegetable inflammable matter, and generally becomes moist. This is the *potash* of commerce. After the colouring matter is destroyed, and a portion of the water dissipated by calcination in a reverberatory furnace, it assumes a spongy texture, with a blueish or greenish colour; and is then denominated *pearl-ashes*.

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[1] *Henry's Elements of Experimental Chemistry*, 7th ed. vol. ii. p. 464.

[2] Of these three appellations that of the Dublin College is the least exceptionable, because it does not convey an erroneous idea of the nature of the substance, which is the case with the others. As synonyma, those of the London College are at complete variance.

Those vegetables only which grow at a distance from salt water, are employed to obtain this product. Herbaceous plants yield the largest proportion, and shrubs more than trees. It has lately been obtained in great abundance from the herbaceous part of the potatoe, cut down just as the fruit is beginning to form: 40,000lbs. of the dried stems yielding 2200lbs. of impure potash.[1] It is generally supposed that at least the greater part of the potash is contained ready formed in the vegetables; but, this is somewhat doubtful, and perhaps in living plants the base only of potash exists as an element, and is oxidized so as to form the alkali during the combustion. Such is the conjecture of Mr. Murray [2]; and the same may take place during the spontaneous decomposition of plants where much water is present, for potash can be obtained by the evaporation of dunghill water.[3]

The pearl-ash of commerce is still a very compound mass, containing, besides the subcarbonate of potash, sand with which it is often adulterated to a great extent, sulphate of potash, muriate of potash, oxide of iron, and oxide of manganese; to the last of which, according to Scheele, it owes its blueish or greenish colour. Different parcels of pearl-ash must undoubtedly contain different quantities of potash; and hence no accurate standard of the proportion of the ingredients can be fixed. The following table drawn up by Vauquelin shows the comparative value of samples from different countries, examined by him. The quantity of each was 1152 parts.[4]

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[1] *Phil. Mag.* vol. i. p. 340.

[2] *Murray's Chemistry*, 2d ed. ii. 193.

[3] See Birch's Experiments, *Phil. Trans.* for 1780, 345.

[4] *Annales de Chimie*, xl. 284.

Kinds of Potash.	Real Potash.	Sulphate of Potash.	Muriate of Potash.	Insoluble Residue.	Carbonic Acid and Water.
Russian potash	772	65	5	56	254=1152
American do.	857	154	20	2	119=1152
Pearl-ash	754	80	4	6	308=1152
Potash of Treves	72	165	44	24	199=1152
Dantzic potash	603	152	14	79	304=1152
Potash of Vosges	444	148	510	34	304=1152

The proportion of real alkali in any quantity of pearl-ash may be ascertained in the following manner: Pulverize 500 grains of the pearl-ash, and digest in successive portions of hot water as long as any thing is dissolved. Mix the solutions, and drop in some diluted sulphuric acid (previously prepared by mixing one part of concentrated acid with thrice its bulk of water) from a phial containing a known quantity of it, till litmus paper indicates the slightest possible excess of acid. Next heat this mixture to expel the carbonic acid; and on trying it again with the litmus paper, if it show any excess of alkali, add a few drops more of acid. Ascertain now by weighing the phial of acid how much acid has been expended in saturating the alkali, and for every 100 parts of real acid set down 121·2 of pure potash.[1]

The pearl-ash of commerce is not sufficiently pure for medicinal use; and therefore it is used only for pharmaceutical purposes.

Officinal preparations. *Potassæ Subcarbonas.* L. E. D.

PRUNUS. *Spec. Plant. Willd.* ii. 984.

Cl. 12. *Ord.* 1. Icosandria Monogynia. *Nat. ord.* Pomaceæ *Linn.* Rosaceæ *Juss.*

G. 982. *Calyx* five-parted, inferior. *Petals* five. *Nut of the drupe* with prominent sutures.

Species 29. P. *domestica.*[2] Common Plum-tree. *Med. Bot.* 2d *edit.* 520. *t.* 187.

Officinal. PRUNA. *Lond.* PRUNI DOMESTICÆ FRUCTUS. *Edin.* PRUNUS GALLICA; FRUCTUS. *Dub.* Prunes.

Syn. Prunes (*F.*) Pflaumen (*G.*) Pruno domestico o Prugna (*I.*) Ciruelas pasas (*S.*)

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[1] The value of the diluted acid must be previously ascertained by adding to 100 grains of it muriate of barytes as long as any precipitate falls. This forms sulphate of barytes, which, when washed and dried at a low red heat, contains 33·3 per cent. of sulphuric acid; by which the proportion of real acid in the diluted acid may be known. *Aikin's Dictionary*, i. 263.

[2] Κυκκυμηλεα Dioscoridis.

The tree which yields this fruit is a native of Asia and Greece, although it is now completely naturalized to our climate, growing wild in coppices, and flowering in April and May. It rises about fifteen feet in height, with a moderately spreading head. The leaves are pale green, standing on short petioles, which have two glands near the base of the leaf; they are serrated, smooth, and when young convoluted and pubescent underneath: the flowers are large, on short solitary peduncles, with an erect calyx, and obovate white petals: the fruit is a superior, berried, oval drupe, swelling a little more on one side, and there-grooved; of a blue violet colour on the outside, internally consisting of a yellow fleshy sweet pulp; and containing a smooth almond-shaped nut.[1]

The dried fruit, which only is officinal, is imported from the continent in chests; and that which is brought from France is regarded as the best. The recent fruit, when perfectly ripe, is pleasant to the palate, and sufficiently wholesome; but when eaten too freely it occasions flatulence, griping and diarrhœa, more readily than any other fruit.

Qualities. — Prunes are nearly inodorous, but have an agreeable, sweet, subacid taste. They contain chiefly mucus, saccharine matter, and malic acid.

Medical properties and uses. — Dried plums or prunes are gently laxative, and form a pleasant addition to purgative electuaries and decoctions. Simply boiled, they may be beneficially given to children who are habitually costive; and in fevers.

Officinal preparation. *Confectio Sennæ.* L. E. D.

PTEROCARPUS.[2] *Spec. Plant. Willd.* iii. 904.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. ord.* Papilionaceæ.

G. 1318. *Calyx* five-toothed. *Legume* falcated, leafy, varicose, surrounded with a wing, not gaping. *Seeds* solitary.

Sp. 6. P. *santalinus.* Red Saunders tree. *Med. Bot. 2d ed.* 430. *t.* 156. *Willdenow Spec. Plant.* iii. 906.

2. PTEROCARPUS SANTALINUS.

Officinal. PTEROCARPI LIGNUM. *Lond.* PTEROCARPI SANTALINI LIGNUM. *Edin.* SANTALUM RUBRUM LIGNUM. *Dub.* Red Saunders wood.

Syn. Santale rouge (*F.*) Sandalholz (*G.*) Sandalo Roso (*I.*) Ract Chandan (*H.*) Racta Chandana (*San.*)

This tree is a native of the mountains of India, particularly the rocky parts in the Onore district [3]; and of Ceylon. It is a lofty tree, with alternate branches, and a bark resembling that of the common alder. The leaves are petiolate and ternate, each simple leaf being ovate, blunt, entire, retuse, veined, smooth on the upper surface, and hoary beneath; the flowers are in axillary spikes, without bractes: the calyx is brown: the corolla papilionaceous, consisting of an erect, obcordate *vexillum*, turned back at the edges, denticulate, curled, and waved, and of a yellow colour, with red veins: yellow, spreading, denticulate *wings* waved at the edges; and an oblong *keel* a little inflated and curled at the tip: the filaments are yellow, and support globular white anthers; the germen is oblong, compressed, hirsute, with a curved style, and an obtuse stigma: the pod is pedicelled, compressed, smooth, keeled along the lower edge; and contains one round, compressed seed.

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[1] Martyn, in his Edition of Miller's Gardener's Dictionary, enumerates sixty varieties of the plum. The French prunes are the same as those which were formerly brought from Damascus.

[2] From πτερον *a wing*, and καρπος *fruit*.

[3] When transplanted to low situations and a richer soil the tree degenerates; and si in all respects less esteemed. *Forbes' Oriental Mem.* 4to. vol. i. p. 808.

This tree, which yields the true officinal red saunders, was first detected by Kœnig in India. It is brought home in billets, which are very heavy, and sink in water.

Qualities. — Red saunders wood has an aromatic odour, and is nearly insipid. It is extremely hard, of a fine grain, and a bright garnet red colour, which deepens on exposure to the air. It yields its colouring matter, which appears to be of a resinous nature, to ether and alcohol, but not to water.[1] The alcohol tincture is red, but becomes yellow when largely diluted with spirits. Volatile oil of lavender also extracts its colouring matter; yet it is scarcely affected by oil of turpentine, which acquires a pale yellow tinge only, even when assisted by heat. Neumann first noticed this fact[2]; and it has been suggested that the camphor contained in the oil of lavender may give it the above property; but camphoretted oil of turpentine has no more effect than the simple oil. I find that by shaking oil of turpentine which has been digested over red saunders with a little alcohol, the slight tinge of colour it received is instantly taken up by the spirit, and the oil settles as a colourless substratum.

Red saunders has no medicinal properties, and is used only as a colouring matter.

PULEGIUM. Vide *Mentha Pulegium.*

PUNICA. *Spec. Plant. Willd.* ii. 981.

Cl. 12. *Ord.* 1. Icosandria Monogynia. *Nat. ord.* Pomaceæ *Linn.* Myrtæ *Juss.*

G. 980. *Calyx* five-cleft, superior. *Petals* five. *Pome* many-celled many-seeded.

Sp. 1. P. *Granatum.*[3] Pomegranate tree. *Med. Bot. 2d edit.* 531. *t.* 190.

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[1] Yet Willdenow, who received the description of the tree and its wood from Kœnig, says, "attritu humido pulchre rubrum tingens." The yielding no colouring matter to water affords an easy mode of distinguishing red saunders from Brazil wood, which was first pointed out by Dr. Lewis. *Thomson's Chem.* v. 208.

[2] *Neumann's Chem.* 337.

[3] Ῥοα Dioscoridis.

Officinal. GRANATI CORTEX. *Lond.* GRANATUM; FLORES, PERICARPII CORTEX. *Dub.* Pomegranate Bark, and flowers.

Syn. Le Grenadier (*F.*) Granatass felschale (*G.*) Pomo Granato (*I.*) Granada (*S*) Rānā (*Arab.*) Anár (*H.*) Darim (*San.*)

The pomegranate tree is a native of the south of Europe, Asia, and Barbary; but in the West Indies, where it was introduced from Europe, the fruit is larger and better flavoured than in its native climates.[1] In its proper soil it rises twenty feet in height, sending out branches the whole length, some of which bear thorns. The leaves are opposite, about three inches long, half an inch broad in the middle, pointed at each end, and of a light lucid green colour: the flowers are terminal, three or four together: the calyx is thick, fleshy, of a fine red colour, and divided into five pointed segments: the petals are wrinkled, and of a scarlet colour: the fruit, according to Gærtner[2], is a pulpy, many-seeded berry, the size of an orange, crowned with the calyx, which is sharply toothed, globular, and a little flatted, and covered with a thick coriaceous rind.

The red succulent pulp, which is not officinal, is pleasantly acid[3], resembling that of the orange: it is cooling, and useful for quenching thirst, and gently aperient.

Qualities. — The *flowers* are inodorous, and taste bitterish and astringent; and the *bark of the fruit* has the same sensible qualities. Water extracts the virtues of both, and the solutions strike a deep blueish black with sulphate of iron.

Medical properties and uses. — Both the parts we have described are astringent. They are given in the form of decoction in chronic and colliquative diarrhœa, and the protracted stage of dysentery. They are supposed to prove beneficial also in checking the violent sweating which accompanies hectic fever; but the chief use of the decoction is as an injection in leucorrhœa, or a gargle in sore throats, after the local inflammation is moderated. Dr. Buchanan has stated that the bark of the root of the plant has been long used by the natives of Hindostan, in tape worm: and from Celsus we find it was used by the ancients for a similar purpose.[4] The bark and flowers are given in the form of powder, in doses of ʒſs to ʒj; or, of a moderately strong decoction, fʒvj may be given every three hours.

PYRETHRI RADIX. Vide *Anthemis Pyrethrum.*

PYRUS. *Spec. Plant. Willd.* ii. 1012.

Cl. 12. *Ord.* 5. Icosandria Pentagynia. *Nat. ord.* Pomaceæ *Linn.* Rosaceæ *Juss.*

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[1] It stands our winters, and even bears fruit, but without the proper flavour.

[2] *De Fructibus*, i. 183. *t.* 38. *f.* 1.

[3] Russel says there are three varieties in Syria; one sweet, another very acid, and a third partaking of the qualities of both blended. *Nat. Hist. of Aleppo*, ii. 85.

[4] Vide *Celsus de Medicina*, lib. iv. § xvii.

G. 992. *Calyx* five-cleft. *Petals* five. *Pome* inferior, five-celled, many-seeded.

Species 17. P. *Cydonia.* The Quince tree. *Med. Bot. 2d ed.* 505. *t.* 182.

Officinal. CYDONIA SEMINA. *Lond.* Quince Seeds.

Syn. Semen de Coignassier (*F.*) Quittenkörner (*G.*) Semi de Cotogno (*I.*) Simiente de Membrillo (*S.*) Hubusnfirjul (*Arab.*) Bebeckeybeej (*H.*)

The quince tree was originally brought from Cydon[1] in Crete by the Greeks; but it has been found growing wild on the rocky shores of the Danube, and is cultivated to great perfection in England, and many other parts of Europe; flowering in May. It is a low crooked tree, with many spreading branches, and covered with a brown bark. The leaves are ovate, very entire, about $2\frac{1}{2}$ inches long, and $1\frac{1}{2}$ inch broad, of a dusky green colour on the upper surface, paler and downy beneath: the flowers are large and solitary: the calyx spreading, persistent, and villous: the petals rose-coloured or white, concave, roundish, and inserted into the calyx: the filaments are awl-shaped, purplish, and support yellow anthers: the fruit is, according to Gærtner, a berry.[2] Its magnitude and shape are those of a moderate-sized pear; it is of a yellow colour, downy, umbilicated; and when ripe has a pleasant odour, and a very austere, acidulous taste[3]: each of its cells contains from eight to fourteen ovate, angled, reddish brown, coriaceous seeds, placed erect in pairs.

Qualities. — The seeds are inodorous, and nearly insipid, having a slight bitterness only when long chewed. The inner coat contains a very considerable quantity of mucus, which can be extracted by hot water; but is not quite pure mucus, being mixed with fecula and the other soluble parts of the seeds. For its qualities and medicinal use, see *Decoctum Cydoniæ* among the Preparations.

QUASSIA.[4] *Spec. Plant. Willd.* ii. 567.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Gruinales *Linn.* Magnoliæ *Juss.*

G. 849. *Calyx* five-leaved. *Petals* five. Nectary five-leaved. *Drupes* five, distant, bivalve, inserted into a fleshy receptacle.

Species 2. Q. *Simaruba.* Simaruba Quassia. *Med. Bot. 2d edit.* 569. *t.* 203. *Trans. of the Royal Society of Edin.* ii. 73—81.

Species 3. Q. *excelsa.* Lofty Quassia. *Trans. of the Royal Society of Edin.* iii. 205—210. *t.* 6.

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[1] Whence its Greek name *μηλια* Κυδωνια is derived.

[2] *De Fructibus*, ii. 45. *t.* 87.

[3] Although the fruit of the quince is not good in its raw state, yet it affords an elegant sweetmeat, called quince marmalade, *mira cydoniarum:* and from the expressed juice an excellent and wholesome wine is prepared.

[4] Named after Quassia, a negro slave, who discovered to Rolander the wood of the Quassia excelsa, which he had employed with success as a secret remedy in the malignant endemic fevers of Surinam.

1. QUASSIA SIMARUBA.

Officinal. SIMARUBÆ CORTEX. *Lond.* QUASSIÆ SIMARUBÆ CORTEX. *Edin.* SIMARUBA; CORTEX, LIGNUM. *Dub.* Simaruba Bark and Wood.

Syn. Ecorce de Simarouba (*F.*) Simarubenrinde (*G.*) Corteccia de Simaruba (*I.*)

The Simaruba quassia, or mountain damson, as it is called in Jamaica, is a native of South America, Carolina, and the West India islands, growing in sandy places. It is a tall tree with alternate branches, and a smooth gray bark, maculated with yellow spots. The leaves are pinnate, consisting of from two to nine leaflets placed alternately on short petioles, elliptical, acute, smooth, and of a deep green colour above, and whitish beneath: the flowers are male and female on the same axillary panicles: the calyx in both is monophyllous and five-toothed: the petals lanceolate, yellowish, white, and inserted into the calyx: the nectary in the male is a small scale affixed to the inner part of the base of each filament; and the same in the female, except that the scales are placed in a regular circle: the filaments in the male are the length of the corolla; and in the female are five connate germens, with five striated styles and spreading stigmas; the fruit, according to Gærtner, consists of five smooth, ovate, black, one-celled berries, on a common receptacle: and opening spontaneously when ripe.[1]

The officinal part of this tree is the bark of the root; and although the wood is designated by the Dublin College, yet it is quite inert. The bark is imported in long pieces, a few inches in breadth, and folded lengthwise. It comes generally from Jamaica packed in bales.

Qualities. — Simaruba bark is inodorous, and has a bitter, but not disagreeable, taste. The pieces are of a very fibrous texture, rough, scaly, warty, and of a full yellow colour in the inside when fresh. Alcohol and water take up all its active matter by simple maceration, at a temperature of 60° Fahrenheit, better than at a boiling heat. The infusion is stronger in taste than the decoction, which grows turbid and of a reddish brown colour as it cools. The infusion is not affected by sulphate of iron, and scarcely by muriate of tin.

Medical properties and uses. — This bark is tonic, and has been employed with advantage in intermittent fever, obstinate diarrhœa, dysentery, and dyspectic affections. It was first introduced at Paris in 1713 as a powerful remedy in dysentery; but its effects in this disease were previously known to the natives of Guiana, whence it was brought to France. Simaruba bark, however, was little known in this country till Dr. Wright's paper on it appeared in the Edinburgh Transactions. It cannot with propriety be used in the commencement of dysentery; but after the fever has abated, when the tenesmus continues with a weak sinking state of the pulse, it allays this symptom and griping, promotes the secretion of urine, determines to the surface, and restores the tone of the intestines. It has also been highly commended as a remedy in fluor albus; but notwithstanding the high character which it acquired, simaruba is not much employed by the British practitioner. It may be combined with aromatics and opium. The dose in substance is from ℈j to ʒſs; but it is more frequently and commodiously given in the form of infusion.

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[1] Owing to this circumstance, Gærtner allows that the pericarp is something between a berry and a capsule. It is certainly not a drupe, although mentioned as such in the generic character by Willdenow.

Officinal preparation. *Infusum Simarubæ.* L.

2. QUASSIA EXCELSA.

Officinal. QUASSIA LIGNUM.[1] *Lond. Edin. Dub.* The wood of Quassia.

Syn. Bois du Quassia (*F.*) Quassienholz (*G.*) Leqno della Quassia (*I.*) Quassia amarga (*S.*)

This species of quassia grows in the natural woods of Jamaica and the Caribbean islands, where it is called the bitter ash; and flowers in October and November. It is a beautiful tall tree, rising sometimes one hundred feet in height, with a trunk straight, smooth, tapering, and often ten feet in circumference near the base; and covered with a smooth gray bark. The leaves are pinnate, consisting of from five to eight opposite pairs of leaflets, with a terminal leaflet: they are oblong and pointed; the ribs reddish; and the young leaves are covered with a fine brown down: the flowers are in clusters from the lower part of the last shoot before the leaves; they are small, of a yellowish green colour, with a very small calyx: the male flowers are nearly similar to the hermaphrodite, except that they have the rudiments only of a style: the fruit is a small black drupe, round, the size of a pea, and attached in threes, sideways, to a round fleshy receptacle. It is ripe in December, and is not bitter.[2] The wood is sent to this country in billets, and is reduced to chips, or rasped by the druggists.[3]

Qualities.—Quassia wood is inodorous, and has an intensely bitter taste; it is of a pale yellow colour. Alcohol and water take up its bitterness, and when evaporated to dryness, leave a brownish yellow, somewhat transparent, brittle extract, which has been regarded as a vegetable constituent *sui generis*, and named the bitter principle.[1] I am inclined to believe that this principle, although not itself of a resinous nature, is connected with resin, as ether takes it up, and the tincture, when evaporated on water, which becomes intensely bitter, leaves an insoluble pellicle that has the character of a resin. The infusion is rendered muddy by nitrate of silver, and a soft, flaky, yellow precipitate formed; and acetate of lead occasions a copious white precipitate: hence these salts are incompatible in formulæ with it.

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[1] The officinal quassia was long erroneously supposed to be the wood of the Quassia *amara*, which is a very rare tree, and excels all the others in bitterness.

[2] *Edinburgh Phil. Trans.* iii. 207.

[3] It is asserted that of late years the brewers have used quassia wood instead of hops. Beer made with it certainly does not keep, but soon becomes muddy, flat, has a mawkish taste, and runs into the acetous fermentation.

Medical properties and uses.—Quassia is tonic. It has been found efficacious in dyspepsia and nervous irritability; intermittent and bilious remittent fevers, chlorosis, diarrhœa; and, when combined with cretaceous powder and ginger, in atonic gout. We have given it, combined with nitric acid, with evident benefit in typhus, and also in fluor albus. Infusion is the best form of administering Quassia; the raspings, for it cannot be properly pulverized, being too bulky: but it may nevertheless be given in substance in doses of from grs. x to ʒj, three or four times a day.

Officinal preparations. *Infusum Quassiæ.* L. *Tinctura Quassiæ excelsæ.* E. D.

QUERCUS. *Spec. Plant. Willd.* iv. 423.

Cl. 21. *Ord.* 6. Monœcia Polyandria. *Nat. ord.* Amentaceæ.

G. 1692. *Male. Calyx* commonly five-cleft. *Corolla* none. *Stamens* five to ten.

Female. Calyx one-leafed, entire, rough. *Corolla* none. *Styles* two to five. *Nut* coriaceous, surrounded at the base by the persistent calyx.

* * *with toothed leaves.*

Sp. 33. Q. *infectoria.* Dyers' Oak. *Olivier's Travels,* (*translation,*) ii. 41. t. 14, 15.

* * * * * *with sinuated leaves and beardless lobes.*

Sp. 65. Q. *pedunculata.* Common Oak. *Med. Bot. 2d edit.* 23. *t.* 10. (*Q. Robur.*) *Smith Flor. Brit.* 1026.

1. QUERCUS INFECTORIA. (*Quercus Cerris.* Edin.)

Officinal. GALLA. *Lond. Edin.* GALLÆ. *Dub.* The Gall.

Syn. Noix de Galles (*F.*) Galläpfel (*G.*) Galla (*I.*) Agalla (*S.*) Maju P'hal (*H.* and *San.*)

The London and Dublin Colleges have not named any particular species of oak, as furnishing the gall; the Edinburgh College has particularised the Cerris: but although it, as well as most of the other species of Quercus, may produce galls, yet it is not the species from which the galls of commerce are obtained. Olivier has distinctly pointed out from his personal knowledge the species above named as the real tree; and as we know no reason for doubting his veracity, we shall copy his description of it.

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[1] *Thomson's Chemistry*, 4th ed. v. 32.

The *Quercus infectoria* is scattered throughout all Asia Minor, from the Bosphorus as far as Syria, from the coasts of the Archipelago as far as the frontiers of Persia. It has a crooked stem, seldom exceeds six feet in height, and more frequently assumes the character of a shrub than that of a tree. The leaves, which are deciduous in autumn, are on short petioles, smooth, of a bright green colour on both sides, and obtusely toothed: the acorn is elongated, smooth, two or three times longer than the cup, which is sessile, in a slight degree downy, and scaly: the gall comes at the shoots of the young boughs, and acquires from four to twelve lines in diameter: the insect which produces it is the *Cynips quercusfolii* of Linnæus, (*Diplolepsis gallæ tinctoriæ* of Geoffroy,) a small hymenopterous insect or fly, with a fawn-coloured body, dark antennæ, and the upper part of the abdomen of a shining brown. The insect punctures the tender shoot with its sting, and deposits its egg in the puncture. This is soon hatched; and in consequence of the irritation occasioned by the maggot feeding on the juices of the plant, a morbid excitement is induced, and kept up in the vessels of the part, sufficient for the production of this kind of vegetable wen.

Galls are gathered before the larva within them changes to a fly, and eats its way out; for when this has happened the galls become lighter, and contain less of the astringent principle. The first galls that are picked are named *yerli* by the natives, and are known in trade by the terms *black* or *blue galls* and *green galls*. Those which are gathered afterwards, from the circumstance of their being pierced, are of an inferior quality, and are denominated *white galls*. The best galls are those of Aleppo, Smyrna, Magnesia, Karahisser, Diarbekir, and the interior of Natolia. Those which are brought to this country come chiefly from Aleppo in bags and cases.

Qualities. — Galls are inodorous, and have a bitter, very astringent taste. They are nearly round, of different magnitudes, from the size of a pea to that of a hazel-nut; smooth on the surface, yet studded with tuberosities; and when good, of a blackish blue, or deep olive colour: a white or a red hue indicates an inferior quality.[1] They are heavy, brittle, break with a flinty fracture, and display a compact striated texture. The whole of their soluble matter is taken up by about 40 times their weight of boiling water, and what remains is tasteless. Alcohol digested on powdered galls takes up seven parts in ten; and ether five parts. The watery infusion reddens tincture of litmus, and forms precipitates with solution of Isinglass, the infusions of Cinchona bark, Cusparia bark, and Columba root: but not with infusion of Quassia. Sulphuric acid throws down a yellowish, curdy precipitate, and muriatic acid one flaky and whitish; while nitric acid changes the colour only of the infusion, first to deep orange, and afterwards to a paler orange yellow. The solution of ammonia occasions no precipitate, but deepens the colour; the carbonate, however, produces a precipitate. Carbonate of potash throws down a yellowish flaky precipitate, and extricates ammonia; and lime water also throws down a copious deep green precipitate. Precipitates also are formed with solutions of the following metallic salts: with acetate and superacetate of lead, grayish; tartarized antimony, yellowish; sulphate of copper, brown; sulphate of iron, blueish black; sulphate of zinc, reddish black, but very slowly formed; nitrate of silver, deep olive; and nitrate of mercury, bright yellow. The muriate of mercury renders the infusion milky and opaque, but no precipitate is formed. The alcoholic tincture reddens litmus, and is affected by the same re-agents as the watery infusion. The ethereal tincture, when evaporated on water, leaves on the side of the glass an opaque pellicle, and on the surface of the water small drops of an oily resinous-like matter, while the substratum of water becomes charged with tannin and gallic acid. The pellicle and resinous-like matter is plastic, tenacious, resembling birdlime treated with ether; and when subjected to heat, melts, swells, burns, and leaves a dense black charcoal. These experiments show results which cannot altogether depend on the presence of tannin, gallic acid, extractive, or mucilage, which are supposed to be the constituents of galls. In Sir H. Davy's experiments, 500 grains of Aleppo galls yielded to pure water by lixiviation 185 grains of solid matter, of which 130 were tannin, 31 gallic acid and extractive, 12 mucilage and matter rendered insoluble by the evaporation, and 12 saline and earthy matter. From different experiments the proportion of extractive, however, if any, is very small: none appears in the evaporation of the ethereal tincture; and Dr. Bostock's experiments render the existence of mucilage very doubtful. From the experiments of Professor Branchi, it appears that galls also yield by distillation with water a concrete, volatile oil.[1] Hence we may conclude that the other constituents of galls, besides tannin and gallic acid, and the above oil, are still unascertained.

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[1] This is the character of the galls from which the insect has escaped; and which are also of a brighter colour. Another species of gall, produced by another species of the insect, is also, Olivier says, found on the same oak. It is spongy, very light, of a brown red colour, covered with a resinous coat, and, furnished with a circular row of tubercles placed nearly towards the most protuberant part. Their astringency is very inferior; and they are used only to adulterate the better sort.

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[1] *Phil. Mag.* vol. i. p. 401.

Medical properties and uses. — Galls are the most powerful of the vegetable astringents. They are seldom used as an internal remedy, although in combination with bitters or aromatics they have been given in obstinate diarrhœas, passive intestinal hæmorrhages, and intermittents. They are frequently ordered in the form of gargles and injections; and an ointment formed of galls in fine powder, with eight parts of simple ointment, and a small proportion of powdered opium, is a useful application to blind piles. For internal exhibition, the dose of galls may be from grs. x to ℈j, twice or thrice a day.

Officinal preparation. *Tinctura Gallarum.* E. D.

2. QUERCUS PEDUNCULATA.

Officinal. QUERCUS CORTEX. *Lond.* QUERCUS ROBORIS CORTEX. *Edin. Dub.* Oak bark.

Syn. Ecorce de la Chene commune (*F.*) Eichenrinde (*G.*) Corteccia della Quercia (*I.*)

This species of oak is indigenous. It is a well-known beautiful tree, often rising to a considerable height; and attaining a great degree of thickness in the trunk, which is covered with a rough brown bark. The leaves are alternate, nearly sessile, ovate-oblong, and sinuated, forming obtuse lobes: deep green, smooth, and shining on the upper surface, paler and nearly glaucous underneath: the flowers are in axillary catkins; the male lax, pendulous, many-flowered, and yellow; the female longer, peduncled, and only three-flowered: the calyx of the male flower is membranous, bell-shaped, often five-cleft; while that of the female is coriaceous, scaly, downy, and becoming hemispherical, entire, and woody: the stamens are ten, longer than the calyx: the germen is ovate, crowned with a short cylindrical style and three stigmas: the fruit is an elliptical, coriaceous, smooth nut, fixed in the calyx as in a shallow cup, but at length dropping from it. It ripens in October.

Almost every part of the oak is astringent, but the bark only is officinal; and, as its epidermis is perfectly inert, it is taken for medicinal purposes from the smaller branches, the epidermis of which is still thin and scarcely cracked. The bark cut in spring is preferable to that cut in winter, as it contains four times the quantity of the astringent principle or tannin.[1]

Qualities. — Oak bark is inodorous, has a rough astringent taste, and yields its virtues to both alcohol and water. The watery infusion is affected by all those tests which indicate the presence of gallic acid, tannin, and extractive (see *Decoctum Quercus*). Sir H. Davy[2] found that ℥j of the inner cortical part of young oak bark affords by lixiviation one hundred and eleven grains of solid matter, of which 77 are tannin; the cellular integument, or middle-coloured part, yields grs. 43 only of solid matter, of which 19 are tannin; and the epidermis furnished scarcely any quantity either of tannin or of extractive. The quantity of tannin, however, varies according to the size and age of the trees, and the season at which they are barked. Vauquelin discovered that the infusion of Oak bark does not precipitate tartarized antimony, or the infusion of Santa Fé Cinchona, which resembles the officinal red Cinchona, although both of these are precipitated by infusion of galls. I find, however, that infusion of Oak bark forms a precipitate with infusion of yellow Cinchona bark.

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[1] Biggin. *Phil. Trans.* 1799.

[2] *Phil. Trans.* 1803.

Medical properties and uses.—Oak bark is tonic and astringent. It has been given united with bitters and aromatics with seeming advantage in intermittents; but it is in every respect inferior to Cinchona, and cannot be depended on. It is, however, useful in obstinate diarrhœa and alvine hæmorrhages; and it is strongly recommended in the malignant coryza (*snuffles*) of infants, when in spite of keeping the bowels regular, and the use of cordials, the child becomes weak and pallid.[1] Its principal use is as a local astringent. (See *Decoctum Quercus.*)

The dose in substance may be from grs. xv to grs. xxx; but it is so difficultly pulverized that it is seldom given in this form.

Officinal preparation. *Decoctum Quercus.* L.

RHAMNUS. *Spec. Plant. Willd.* i. 1092.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Dumosæ *Linn.* Rhamni *Juss.*

G. 405. *Calyx* tubular. *Corolla* scales defending the stamens inserted into the calyx. *Berry.*

* *Thorny.*

Species 1. R. *catharticus.* Purging Buckthorn. *Med. Bot.* 2d *ed.* 594. *t.* 210.

Officinal. RHAMNI BACCÆ. *Lond.* RHAMNI CATHARTICI SUCCUS. *Edin.* RHAMNUS CATHARTICUS; BACCÆ. *Dub.* Buckthorn Berries.

Syn. Nerprun (*F.*) Kreutz beeren (*G.*) Bacche del spino Cervino. (*I.*)

This is an indigenous shrub, growing in woods and hedges near brooks; flowering in May and June, and ripening its fruit in October. It rises with a strong rigid woody stem, sending off alternate round branches, which terminate in a spine. The leaves are in fascicles, on footstalks, ovate, serrated, nerved; and the younger one downy: the flowers come from the same buds as the leaves; they are peduncled, of a greenish yellow colour, four-cleft; and frequently, but not always, they are male and female upon different plants: the anthers are round, on short filaments which rise from the base of a small convex scale: the germen is ovate, with a slender style and four-cleft stigma: the fruit is a small, round, black, four-seeded berry, about the size of a pea, compressed on one side.[1]

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[1] Underwood, *Diseases of Children*, 4th ed. i. 45.

These berries are said to be often mixed with those of the black-berried alder and of the dog-berry tree; but as the buckthorn berry has four seeds, while the others have only two and one, it can be easily distinguished.

Qualities. — The odour of these berries is faint and unpleasant, the taste bitterish, acrid, and nauseous. They are very succulent, and yield by expression a deep green juice, or a purple juice, if they be gathered late in the autumn.

Medical properties and uses. — The berries, or their expressed juice, are briskly cathartic; but their operation is accompanied with thirst and severe griping, which is not altogether mitigated by the most plentiful dilution. They were formerly much used as a hydragogue purgative, but are now very seldom prescribed. The dose of the recent berries is ℈j; that of the expressed juice f℥j, or ʒj of the dried berries.

Officinal preparation. *Syrupus Rhamni.* L. E.

RHEUM.[2] *Spec. Plant. Willd.* ii. 488.

Cl. 9. *Ord.* 3. Enneandria Trigynia. *Nat. ord.* Holoraceæ *Linn.* Polygoniæ *Juss.*

G. 803. *Calyx* 0. *Corolla* six-cleft, persistent. *Seed* one, three-sided.

Sp. 2. R. *undulatum.* Wave-leaved Rhubarb. *Amœn. Acad.* iii. 212. *t.* 4.

Sp. 3. R. *palmatum.* Palmated Rhubarb. *Med. Bot. 2d ed.* 662. *t.* 231. *Phil. Trans.* iv. 292. *t.* 12, 13.

1. RHEUM UNDULATUM.

Officinal. RHEUM UNDULATUM; RADIX. *Dub.* The root of Waved-leaved Rhubarb.

Syn. Rhubarb (*F.*) Rhabarber (*G.*) Rabarbaro (*I.*) Ruibarbo (*S.*) Rāwend (*Arab.*) Révand Chîni (*H.*)

This species of rheum was supposed by Boerhaave to be the true Chinese rhubarb; and as it is not unlikely that foreign rhubarb is taken from several species, that which we receive by way of Canton, which certainly differs more than simply in the drying from that which comes through Russia, may be the produce of this plant; and the Dublin College is right in giving it a place in the list of materia medica. It is a native of China and Siberia, but grows well in this country. The root divides into a number of thick fibres, which run deep, and are extremely yellow within: the leaves, which appear early in the spring, are supported on moderately thick footstalks, channelled on their under side, and plain on their upper: the leaves are long, running to a point much waved on their edges, a little hairy on the upper surface, and very strongly veined on the under: the flower-stem is of a pale brownish colour, rising about four feet high, and dividing into several loose panicles, or bunches of white flowers, which appear in May, and are succeeded by triangular seeds that ripen early in the season.

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[1] The pigment called sap green is the inspissated juice of this berry.

[2] Ῥηον Dioscoridis.

2. RHEUM PALMATUM.

Officinal. RHEI RADIX. *Lond. Edin. Dub.* Rhubarb root.

This species, like the former, is a native of China and Tartary; and arrives at considerable perfection, when cultivated in this country. The root is perennial, thick, oval, branched, externally brown, and internally of a deep yellow colour: the stem, which rises eight or ten feet in height, is erect, round, hollow jointed, slightly furrowed, sheathed, and branching at the top: the lower leaves stand upon long smooth petioles; are numerous, large, rough, of a roundish shape, and deeply sinuated into lobes, which are irregularly pointed; those of the stem spring from the joints, are sheathing, and gradually lessen in size toward the top of the stem: the flowers surround the branches in numerous clusters, forming a kind of spike: they appear in May: the corolla is divided into six obtuse very small segments of a greenish white colour: the filaments are nine, slender, the length of the corolla, and furnished with oblong double anthers: the style is short, with three reflected stigmas: and the germen is a triangular seed, with membranous reddish margins.

This plant has been generally believed to be the species which yields the foreign rhubarb; and under this belief, a very excellent and correct description of it was given by Dr. Hope, professor of botany at Edinburgh, in the Philosophical Transactions for 1765. He had raised it from seed sent to him by Dr. Mounsey from Petersburgh two years before, and found that the root possessed all the medicinal qualities of the best foreign rhubarb. Since that period many laudable attempts have been made to introduce the cultivation of rhubarb into this country, in sufficient quantity to supply our domestic consumption of this valuable drug: but although many individuals have reared large quantities, and some of it extremely good, yet so powerful is prejudice, that very little of it can be sold, and the efforts, therefore, of the cultivators have of late very much relaxed.[1] It is still, however, uncertain which of the species yields the foreign rhubarb; nor is it of very great importance, as the roots of the two species above described, and another, the R. *compactum*, accord so very closely in their medicinal powers, that any of them may be used with equal certainty of success.

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[1] For an excellent account of those different trials, and some very judicious observations on the mode of cultivating rhubarb, see *Millar's Dictionary*, edited by Dr. Martyn, article *Rheum*.

Three varieties of rhubarb are known in the shops, named from the places whence we receive them; *Russian* rhubarb, *Turkey* rhubarb, and *East Indian* or *Chinese* rhubarb. The two first resemble each other in every respect, appearing to be the root of the same species of plant, prepared in the same mode; and although the East Indian is seemingly the root of a different species, yet we are informed by Dr. Rehman[1], that it is the same, only prepared with less care.

All the rhubarb of commerce, known under the names Turkey or Russian, grows on the declivities of the chain of mountains in Tartary, which stretches from the Chinese town Sini to the lake Kokonor, near Thibet. The soil is light and sandy; and the Bucharians assert that the best grows in the shade on the southern side of the mountains. Rhubarb, however, is also cultivated in China, in the province of Shen-see, where it is called *Hai-houng*. In Tartary the roots are taken up twice a year in spring and in autumn[2], and after being cleansed, and decorticated, and the smaller branches cut off, the body of the root is divided transversely into pieces of a moderate size, which are placed on tables, and turned three or four times a day, during five or six days. A hole is then bored through each piece, by which it is hung up to dry exposed to the air and wind, but sheltered from the sun. In about two months the roots have lost seven parts in eight of their weight[3], and are fit for the market. In China the roots are not dug up till winter[4]; and the cultivators, after cleaning, scraping off the bark, and cutting them, dry the slices by frequently turning them on stone slabs heated by a fire underneath; after which the drying is completed by hanging them up in the air exposed to the greatest heat of the sun.[5] As soon as the rhubarb has been dried where it is grown, it is conveyed to Si-ning, where it is again cleaned and aired, and after being cut into smaller pieces and sorted, a large hole is drilled through that intended for the Russian market, in virtue of the contract made with the Russian Government, for the examination of the heart of the pieces. It is then packed up in camel's-hair sacks, and conveyed to Mac-ma-tchin, where it is examined previously to its being transported to Kiachta. The whole of the trade in rhubarb, in China, is carried on by one Bucharian family, which has enjoyed the monopoly since 1772; and it is even by the agents of this family, that it is sold to the English at Canton. This Bucharian family resides at Sin-ning Fu, a town on the frontiers of Thibet, about 3000 verstes from Kiachta, the town on the Russian frontier, where the rhubarb is purchased on the account of the Russian Government. Part of the Tartarian rhubarb is carried to Turkey through Natolia; but the greater part is conveyed by the Bucharians to Kiachta, where it is examined by a Russian apothecary. The best pieces only are selected and sent to Petersburgh. It is in roundish pieces perforated with a large hole, of a yellow or reddish colour on the outside, somewhat soft and friable, and when broken exhibiting many diverging streaks of a beautiful bright red colour. Agreeably to the contract with Russia, all which is rejected must be burnt: and even that which is approved undergoes another cleaning before it is finally packed up for St. Petersburgh.[1] The Chinese rhubarb, at least what we receive under that appellation, is conveyed to Canton, and there purchased by the East India Company's agents, who purchase all qualities; whence it is brought to this country by sea. It is in oblong, sometimes flat pieces, seldom perforated; considerably heavier, more compact, and less friable than the former kind; of a brownish yellow colour on the outside; and which when broken appear of a dull colour, variegated with yellow and white. Both kinds are brought to this country in cases and chests.

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[1] The best Treatise on the Commerce of Rhubarb, and from which much of the information contained in this article has been taken, is from the pen of Dr. Rehman. Vide *Mem. de la Société Imperiale des Nat. de Moscow.* 1809. t. ii. p. 126.

[2] *Bell's Travels.*

[3] *Bath Papers*, iv. 175.

[4] *Bath Papers*, ii. 249.

[5] It is in the process of drying the roots that the British rhubarb cultivators are supposed to fail. Baumé proposes to steep the roots in water, to deprive them of their gummy matter, before drying them; then to lay them upon twigs in the open air for twelve hours, and lastly to place them in a stove heated to 120°, till they are dried. When sufficiently dry the wrinkles must be rasped out, and the pieces shaken together in a barrel turned on an axis, for half an hour, which covers them with a fine yellow powder formed by their attrition.

Qualities.—Good *Russian* or *Turkey* rhubarb has a peculiar, somewhat aromatic odour, and a bitter, slightly astringent, subacrid taste; feels gritty between the teeth when chewed, and tinges the saliva of a bright yellow colour. It breaks with a rough hackly fracture, is easily pulverized, and affords a powder of a bright buff yellow colour. It should not be porous, but rather compact and heavy. Water at 212° takes up 24 parts in 60; the infusion is of a brown colour nearly clear, and reddens litmus paper. Alcohol extracts 2·7 from 10 parts, and gives a tincture of a rich golden colour, which reddens tincture of litmus; is not altered in its transparency by the addition of water; and strikes a blackish olive hue with solution of sulphate of iron, but no immediate precipitate falls. Sulphuric ether takes up 1·5 in 10 parts of this rhubarb; the tincture is of a golden yellow hue, and when evaporated on water, leaves a thin pellicle of yellow resin and abundance of extractive dissolved in the water, combined, however, with tannin. *East Indian* or *Chinese* rhubarb has a stronger odour, and is more nauseous to the taste than the Turkey; breaks with a more compact and smoother fracture; and affords a powder of a redder shade. Water takes up 30 parts in 60; the infusion is not so deep-coloured as that of Russian rhubarb, is more turbid, and reddens also litmus paper. Alcohol extracts 4 parts in 10; the tincture is of a much deeper colour, and brownish; gives a deeper red to litmus tincture; is rendered slightly turbid by the addition of water; and strikes a green, not black, olive with sulphate of iron, which it also quickly and copiously precipitates. Ether takes up 2 parts in 10; the tincture is deeper coloured, and when evaporated on water affords the same results as the former kind, except that the compound of tannin and extractive is more soluble.

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[1] At this examination each piece is struck with a small mallet, to detach from it any impurities, or decayed parts.

The infusion of Chinese rhubarb is more copiously precipitated by solution of isinglass than that of the Russian. Infusion of yellow cinchona throws down a copious greenish precipitate from infusion of Russian rhubarb, and a less copious, but more dense bright yellow precipitate from that of Chinese rhubarb.

The following Tables show the effects of re-agents on the aqueous infusions of the two varieties of rhubarb.

TABLE I. Precipitates formed by Acids, Alkalies, and Neutral Salts.

Variety of Rhubarb.	Sulphuric Acid.	Nitric Acid.	Muriatic Acid.	Oxymuriatic Acid.	Solution of Potash.	Solution of Subcarbonate of Potash.	Lime Water.	Muriate of Barytes.	Silicated Potash.
Russian.	copious, greenish yellow.	scanty, flocculent, pale yellow.	scanty, very slowly formed, yellow.	slowly formed, pale olive.	none, but strikes a deep lake colour.	none, but strikes reddish brown.	scanty, slowly formed, brown.	scanty, olive green.	none, but strikes a deep brown.
Chinese.	more copious, brownish yellow.	less scanty, pale yellow.	scanty, quickly formed, brownish yellow.	slowly formed, orange yellow.	none, a deeper lake.	none, but renders it turbid, and deep reddish brown.	copious, quickly formed, brown.	less scanty, orange yellow.	none, but strikes a deep brown.

TABLE II. Precipitates formed by Solutions of Metallic Salts.

Variety of Rhubarb.	Solution of Oxysulphate of Iron.	Solution of Nitrate of Silver.	Solution of Nitrate of Mercury.	Solution of Nitrate of Lead.	Solution of Muriate of Mercury.	Solution of Acetate of Lead.	Solution of Tartarized Antimony.
Russian.	copious, nearly black.	scanty, pale greenish yellow.	copious, olive yellow.	scanty, slowly formed, yellow.	scanty, slowly formed, pale olive.	scanty, greenish yellow.	scanty, slowly formed, whitish.
Chinese.	copious, deep olive green.	copious, orange yellow.	copious, heavy, bright yellow.	scanty, slowly formed, deeper yellow.	copious, quickly formed, heavy yellow.	copious, yellow.	scanty, still more slowly formed.

When the residue, after the action of water, is digested in muriatic acid, and solution of ammonia added in excess, the liquid becomes milky, and deposits oxalate of lime. What remains consists of woody matter, a small portion of alumen, and silex. Of the specimens which I examined, one drachm of Russian rhubarb yielded twenty-six grains of the oxalate, while the same weight of East Indian yielded only eighteen grains.

From the results of the above experiments, rhubarb appears to contain a large portion of *extractive matter*, a small portion of *resin*, *mucus*, *tannin*, *gallic acid*, a *colouring matter*, much *oxalate of lime*, and minute proportions of *alumen* and *silex*. They show that the two varieties differ from each other in several respects. The Russian contains more tannin, oxalate of lime, and resin; the Chinese more extractive and gallic acid. But the purgative principle is still unascertained, although it appears to be combined with the extractive, and hence is soluble in water.

Medical properties and uses. — Rhubarb is stomachic and astringent or purgative, according to the extent of the dose in which it is administered. With a view to the first-mentioned properties, it is usefully given in dyspepsia, hypochondriasis, and in a weakened relaxed state of the bowels, combined with ginger, nutmeg, soda, or bitters.

As a purgative it operates mildly, and may be given to the youngest infants. Its operation is quickened by the addition of neutral salts and calomel, the purgative powers of which it also reciprocally augments; so that a compound formed of small portions of rhubarb and a neutral salt or calomel, acts with more certainty and quicker than large doses of either separately taken. Rhubarb is particularly adapted for the majority of cases of diarrhœa, as it evacuates any acrid matter that may be offending the bowels, before it acts as an astringent. Externally its powder is sometimes sprinkled over ulcers, to assist their granulation and healing.

The Chinese use it medicinally; but they chiefly employ it to colour a spirituous liquor.

Rhubarb is given in a variety of forms (see Preparations), but its purgative properties are most powerful in substance. From ℈j to ʒſs of the powdered root opens the bowels freely; and from grs. vi to grs. x may be given for a dose, when its stomachic properties only are required.

Officinal preparations. *Infusum Rhei.* L. E. *Vinum Rhei.* E. *Tinctura Rhei.* L. E. D. *Tinctura Rhei composita.* L. *Tinctura Rhei et Aloes.* E. *Tinctura Rhei et Gentianæ.* E. *Pilulæ Rhei compositæ.* E.

RHODODENDRON. *Spec. Plant. Willd.* ii. 603.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Bicornes *Linn.* Rhododendra *Juss.*

G. 867. *Calyx* five-parted. *Corolla* nearly funnel-shaped. *Stamens* declined. *Capsule* five-celled.

Species 7. R. *chrysanthum.* Golden-flowered Rhododendron. *Med. Bot.* 2*d edit.* 299. *t.* 103. *Pall. Ross.* i. *p.* 44. *t.* 30.

Officinal. RHODODENDRI CHRYSANTHI FOLIA. Edin. The leaves of Rhododendron.

Syn. Rosage (*F.*) Gelber Alpbalsam (*G.*) Rhododendro Aureo (*I.*)

This beautiful shrub is a native of the mountainous parts of Siberia, flowering in June and July. It rises a foot in height, and sends off spreading branches which are covered with a brown bark. The leaves are terminal, oblong, ovate, and attenuated to the petiole; few, smooth, stiff, with the margin entire and bent in; the upper surface reticulated, rugged, and of a deep green colour; and the under ferruginous or glaucous. The flowers are large, yellow, and terminate the branches, forming umbels: the calyx is persistent; the corolla monopetalous, inclining, and irregularly divided into five spreading segments: the filaments are slender, nearly as long as the corolla, supporting oval anthers; and the germen is pentagonal, bearing a long slender style, crowned with a five-lobed stigma. The capsule is ovate, somewhat angular; and contains many small gray irregular seeds, like sawdust.

Qualities.—The leaves of this plant are inodorous, and have an austere, astringent, bitterish taste. Water extracts their virtues either by infusion or decoction.

Medical properties and uses.—Yellow rhododendron leaves are stimulant, narcotic, and diaphoretic. When taken, they first increase the arterial action and the heat of the body, producing diaphoresis; and these effects, according to Dr. Home's observations, are followed by a proportional diminution of excitement, the pulse in one case having been reduced thirty-eight beats. In large doses they produce nausea, vomiting, purging, delirium, and all the symptoms of violent intoxication. Both the plant and its effects were first described by [1]Gmelin and Steller, in 1747, as a Siberian remedy for rheumatism; but it was not much noticed till after 1779, when Kœlpin strongly recommended it in this disease, and also in gout and lues venerea. Besides the effects we have already mentioned, it is said to excite a creeping sensation in the pained parts, which after a few hours subsides, and at the same time the pain is relieved. It has not been much used in this country, but, from the result of some trials of it in Scotland, it has obtained a place in the Edinburgh Pharmacopœia.

It is given in the form of decoction, made by boiling ʒiv of the leaves in fʒx of water, in a close vessel, over a slow fire for twelve hours. The dose of the strained liquor is from f℥j to f℥ij given twice a day, and gradually increased.

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[1] *Flora Sibirica*, iv. 121.

RHUS.[1] *Spec. Plant. Willd.* i. 1479.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Dumosæ *Linn.* Terebintaceæ *Juss.*

G. 566. *Calyx* five-parted. *Petals* five. *Berry* with one seed.

** *with ternate leaves.*

Species 17. R. *Toxicodendron.* Poison Oak. Sumach. *Kalm's Travels,* ii. 318.

Officinal. TOXICODENDRI FOLIA. *Lond.* RHOIS TOXICODENDRI FOLIA. *Edin.* Sumach leaves.

Syn. Toxicodendron; Herbe à la Puce (*F.*) Rus Tossicodendro (*I.*)

This shrub is a native of North America. It seldom exceeds three feet in height; the root sending up many stems, which divide into slender woody branches, and are covered with a brownish bark. The leaves are placed alternately, supported on long petioles; and are composed of three oval leaflets, about three inches long, and one inch and a half broad, angularly indented, hoary on the under-surface, and of a deep shining green colour on the upper: the two lateral leaflets are nearly sessile, and the terminal one is considerably the largest of the three: the male flowers, which are on a distinct plant from the female, spring from the sides of the stalks in close short spikes, and are of an herbaceous colour; the female, which are larger, are produced in loose panicles, and embosom a roundish germen supporting three very short styles: the fruit is a striated berry.

The stems, if cut or broken, exude a milky juice, which was supposed to inflame the skin wherever it touched; but this is not the case, although the plant exudes a deleterious vapour.[2] The juice becomes black when it is exposed for a short time to the action of atmospheric air.[3]

Qualities.—The leaves of Toxicodendron are inodorous, and have a mawkish subacrid taste. Their virtues are completely extracted by water, and partially by alcohol. The aqueous infusion reddens litmus paper; precipitates the solution of sulphate of iron black; that of nitrate of silver brown; and throws down a precipitate with gelatine. Hence it contains gum, resin, gallic acid, and tannin; but a narcotic principle is also present, on which its effects principally depend.

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[1] Ῥοῦς Dioscoridis.

[2] Vans Mons has proved that the acrimonious matter of the plant is exhaled during the night, combined with carbonated hydrogen gas. He collected a jar full of the gas, and on his brother, who was very susceptible of the poison of this species of rhus, plunging his arm into it, the skin was quickly inflamed and blistered. *Actes de la Soc. de Med. de Bruxelles.*

[3] This juice forms an indelible black stain on linen cloth; and is used in Japan, where the shrub is a native, as a varnish. *Phil. Trans.* xlix. 158.

Medical properties and uses. — The leaves are stimulant and narcotic. In the hands of Dr. Alderson of Hull, who introduced them as a remedy, they proved successful in several cases of paralysis; but we believe their efficacy in this disease has not been confirmed by the observations of other physicians. They excite a sense of heat and pricking, and irregular twitchings in the affected limbs. We believe some advantage has been found from their use in herpetic eruptions. They have also been found useful in the form of tincture, in cramp of the stomach.

The dose of the powdered leaves may be gr. ſs, given twice or thrice a day, and gradually increased to grs. iv, in the form of a bolus.

RICINUS. *Spec. Plant. Willd.* iv. 564.

Cl. 21. *Ord.* 8. Monœcia Monadelphia. *Nat. ord.* Tricoccæ *Linn.* Euphorbiæ *Juss.*

G. 1720. *Male. Calyx* five-parted. *Corolla* 0. *Stamens* numerous. *Female. Calyx* three-parted. *Corolla* 0. *Styles* three, bifid. *Capsule* three-celled. *Seed* one.

* *with palmated leaves.*

Sp. 1. R. *communis.*[1] Common Ricinus or Palma Christi. *Med. Bot. 2d ed.* 625. *t.* 221. *Rheede Hort. Malab.* ii. 57. *t.* 32.

Officinal. RICINI SEMINA ET OLEUM. *Lond.* RICINI COMMUNIS SEMINA; ET OLEUM FIXUM. *Edin.* RICINUS; OLEUM E SEMINIBUS EXPRESSUM. *Dub.* The seeds, and the fixed oil of the seeds of the Ricinus. Castor oil.

Syn. Le Noix et l'huile du Ricin (*F.*) Rizinuskorner; Rizinusöhl (*G.*) I semi e l'olio di Ricino (*I.*) Palmoel; Ricin soel (*S.*) Erunda (*San.*) Khirwa (*Arab.*) Sittāmoonāka unnay (*Tam.*)

This species of Ricinus is an annual plant, a native of the East and West Indies, South America, and Africa.[2] It is of very quick growth, and sometimes attains to the height of sixteen feet.[3] The stem is round, thick, jointed, furrowed, glaucous in the lower part, but of a purplish red colour towards the top: the leaves are petiolate and subpeltate, large, deeply divided into seven pointed serrated lobes, and of a blueish green colour: the calyx of the *male* flower is composed of five oval, pointed, purplish segments, inclosing many long stamens united at the base; the *female* is at the upper part of the spike, and is composed of a three-cleft, reddish calyx: the styles are three, slender, and forked at the apex: the capsule is a trilocular nut, covered with rough spines, and bursting elastically to expel the seeds, which are generally three, and of an oblong flat figure, and white colour.

The oil, which is more frequently used than the seeds, is obtained from the seeds both by coction and expression. The former method was generally used till lately; and was performed by tying up the seeds, previously decorticated and bruised, in a bag, which was suspended in boiling water till all the oil was extracted and rose to the surface, when it was skimmed off. This mode of preparation is still preferred by many of the West Indian practitioners; but as the oil is apt to get soon rancid when thus prepared, it is now obtained, both at home and abroad, by subjecting the seeds to the press, in the same manner as almonds to procure almond oil. The oil obtained is equal to one-fourth of the weight of the seeds employed.

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[1] Κικι Dioscoridis.

[2] It was first cultivated in Britain in 1562.

[3] It has been asserted that this plant is in some places perennial, becoming a large tree. Willdenow, however, says, "Planta semper annua, nunquam fruticosa vel arborea, nec in calidissimis terræ plagis lignescit." *Spec. Plant.* iv. 564.

Qualities. — Good expressed castor oil is nearly inodorous and insipid: but the best leaves a slight sensation of acrimony in the throat after it is swallowed. It is thick, viscid, transparent, and colourless, or of a very pale straw colour; that which is obtained by coction has a brownish hue; and both kinds, when they become rancid, thicken, deepen in colour to reddish brown, and acquire a hot, very nauseous taste. It has all the chemical characters of the other expressed oils, except that it is almost completely soluble in sulphuric ether.

Medical properties and uses. — The seeds are drastic cathartics, but are scarcely ever ordered. The oil is mildly purgative, operating very quickly, and with so little irritation, as to render it peculiarly fitted for cases in which the stimulating purgatives would prove hurtful; as in ileus, colica pictonum, (in which it may be advantageously joined with henbane,) calculous affections, piles, and after surgical operations in which the abdominal viscera are concerned. In dysentery, in which this oil is particularly indicated, the stomach will seldom retain it; but when this is the case it may be efficaciously exhibited per anum. It is also an excellent purgative for infants, even of the tenderest age, and for women in child-bed.

The dose is from fʒiv to f℥jſs, either floated on a little water, and covered with a small quantity of any ardent spirit; or diffused in a cup of coffee; or in water, by means of mucilage of acacia gum, or the yolk of egg. The addition of some aromatic tincture is generally necessary to make this oil remain on the stomach.

ROSA. *Spec. Plant. Willd.* ii. 1063.

Cl. 12. *Ord.* 5. Icosandria Polygynia. *Nat. ord.* Senticosæ *Linn.* Rosaceæ *Juss.*

G. 997. *Petals* five. *Calyx* pitcher-shaped, five-cleft, fleshy, contracted at the neck. *Seeds* numerous, hispid, affixed to the inner side of the calyx.

** *with ovate germens.*

Species 15. R. *centifolia.* Hundred-leaved Rose. *Med. Bot. 2d ed.* 495. *t.* 178.

Species 16. R. *gallica.* Red Rose. *Med. Bot.* 2*d edit.* 497. *t.* 179.
Species 31. R. *canina.* Dog Rose, or Hep Tree. *Med. Bot.* 2*d ed.* 493. *t.* 177. *Smith Flor. Brit.* 540. *Gærtner*, i. 347. *t.* 73.

1. ROSA CENTIFOLIA.

Officinal. ROSÆ CENTIFOLIÆ PETALA. *Lond. Edin.* ROSA DAMASCENA; PETALA. *Dub.* The petals of the Hundred-leaved Rose.

Syn. Wurd (*Arab.*) Goolăbu-poo (*Tam.*)

Although this species of rose be commonly cultivated in almost every garden in Europe, yet the place whence it was originally brought is still undetermined, notwithstanding Loureiro's assertion that it is a native of China. In the Dublin Pharmacopœia it is improperly confounded with the damask rose, which is altogether a different species.[1] The bush rises with prickly stems about three feet in height. The leaves consist of two or three pair of leaflets, with a terminal one, attached on very short petioles to a rough common footstalk: the leaflets are oval, broad, smooth, of a deep green colour on the upper surface, hairy on the under, and serrated, with purple edges. The flowers, which appear in June, are large, supported on peduncles beset with brown, bristly hairs. The segments of the calyx are semipinnate; the petals large, of a beautiful pale red colour, fragrant, and very numerous.

The varieties of this species of rose are very many; but for medicinal purposes they may be indiscriminately used. The petals only are employed.

Qualities. — Their odour is extremely fragrant, and their taste sweetish, subacidulous, and at last very slightly bitter. In distillation with water, a small portion of a butyraceous oil is obtained; and the water is strongly impregnated with the odour of the rose.

Medical properties and uses. — The petals of this species of rose are slightly laxative; and as such are ordered, combined with sugar, in the form of a syrup, as an adjunct to oil and other purgatives in infantile diseases: but they are chiefly employed for the distillation of rose-water.

Officinal preparations. *Aqua Rosæ.* L. E. D. *Syrupus Rosæ.* L.E.

2. ROSA GALLICA.

Officinal. ROSÆ GALLICÆ PETALA. *Lond. Edin.* ROSÆ RUBRÆ PETALA. *Dub.* The petals of the Red Rose.

Syn. Fleurs des Roses rouges (*F.*) Essig-rosen (*G.*) Rosa domestica (*I.*)

This species is a native of the south of Europe, cultivated in our gardens, and flowering in June and July. The stalks rise about three feet in height, are erect, and almost destitute of prickles. The foliage resembles that of the *centifolia*; but the leaflets are not so large, scarcely tomentose below, and subacute.

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[1] See *Hort. Kew. Willdenow, &c.* Gerarde cultivated this species in 1596.

The flowers also are less doubled; the petals large, widely spread open, of a deep rich crimson colour, fragrant, and displaying an abundance of yellow anthers, on thread-like filaments; with the papillary stigmas of numerous connected villose styles, rising from the germen. The petals of the unblown buds are the parts medicinally used. They are cultivated in abundance in the neighbourhood of London for medicinal purposes.

Qualities.—The odour of this rose is less fragrant than that of the former species, but it is improved by drying: the taste is pleasantly bitter, and austere. Water at 212° extracts both its odour and taste; and the infusion strikes a black with sulphate of iron; and also forms a precipitate of a dark colour with sulphate of zinc.

Medical properties and uses.—The red rose is astringent and tonic. It forms an elegant and useful vehicle for the exhibition of mineral acids, nitrate of potash, and other neutral salts, in hæmorrhages, and many other diseases. (See the Preparations of it.)

Officinal preparations. *Confectio Rosæ.* L. E. D. *Infusum Rosæ.* L. E. D. *Mel Rosæ.* L. D. *Syrupus Rosæ.* E.

3. ROSA CANINA.

Officinal. ROSÆ CANINÆ PULPA. *Lond.* ROSÆ CANINA FRUCTUS. *Edin.* The pulp of the Dog-rose fruit, or Hep.

Syn. Le fruit d'Eglantier de Chien (*F.*) Hagebutten (*G.*) La polpa di fruti di Rosa canina (*I.*)

This species is a common but beautiful ornament of our hedge-rows, flowering in June, and exhaling a very fragrant perfume. It rises to the height of eight or ten feet, has a smooth stem; with two alternate, compressed, conical-hooked, bright red internodial prickles; and elongated branches spreading from the upright. The leaves are pinnate, composed of seven ovate, pointed, inodorous leaflets, naked and smooth on both sides, but the upper shining, and of a deeper green than the under. The petioles are prickly and glandular. The floral peduncles generally form a kind of corymb; but are sometimes solitary and smooth. The calyx is pubescent within, and on the margin: the petals are inversely cordate, generally five, of a pale flesh colour, often white, and odorous. The fruit is an ovate, fleshy, smooth, red-berried calyx, with the apex sometimes open, sometimes shut, containing about thirty long angular seeds, embedded among white silky bristles.

Qualities.—The fruit is inodorous, and has a pleasant sweet acidulous taste, depending on uncombined citric acid and sugar, which it contains.

Medical properties and uses.—The pulpy part of heps is cooling, but possesses no direct medicinal properties. It is used only for the formation of the confection.

Officinal preparation. *Confectio Rosæ caninæ.* L.

ROSMARINUS. *Spec. Plant. Willd.* i. 126.

Cl. 2. *Ord.* 1. Diandria Monogynia. *Nat. ord.* Verticillatæ *Linn.* Labiatæ *Juss.*

G. 62. *Corolla* unequal, with the upper lip two-parted. *Filaments* long, curved, simple with a tooth.

Species 1. R. *officinalis.*[1] Officinal Rosemary. *Med. Bot. 2d edit.* 329. *Sibthorp Flora Græca. t.* 14.

Officinal. ROSMARINI CACUMINA. *Lond.* ROSMARINI OFFICINALIS CACUMINA. *Edin.* ROSMARINA; HERBA. *Dub.* Rosemary tops.

Syn. Romarin (*F.*) Rosmarin (*G.*) Ramarino (*I.*) Remero (*S.*)

This plant is a native of the south of Europe, Greece, and Barbary; but has been long cultivated in Britain, where it flowers in April and May. It is an evergreen, erect, very branching shrub, rising about four feet in height; the branches thickly covered with leaves, and the smaller ones four-cornered and downy. The leaves are opposite, almost sessile, more than an inch in length, and one-sixth of an inch broad, linear, obtuse, entire, with the margin turned back; of a dark green colour, smooth, and shining on the upper side, woolly, veined, and of a silvery hue on the under. The flowers, which are placed on little axillary, opposite, leafy branches, are axillary and terminal, erect, on short stalks. The calyx is bell-shaped, bilabiate, villous; the upper lip entire, the under cloven into two pointed segments: the corolla is ringent, downy, pale blue, variegated with purple and white; the tube longer than the calyx, a little compressed, the upper lip erect and bifid, the lower cleft into three segments, the middle one larger, concave, and notched. The stamens are longer than the upper lip, arched, furnished with a tooth above the base, and supporting an oblong, blue, terminal anther. The style is the length of the stamens, thread-like, arched, and terminated by a simple sharp stigma. The seeds are four, oblong, and lodged in the bottom of the calyx.

Qualities. — Both the leaves and flowers have a grateful aromatic odour, and a bitterish warm pungent taste, depending on an essential oil, which appears to be combined with camphor: Vide *Ol. rosmarini.* Alcohol extracts its virtues completely, but they are only partially given out to water. By distillation with water, its essential oil is obtained. The leaves afford the greatest quantity; the flowers the smallest.

Medical properties and uses. — Rosemary is stimulant, and, according to some, emmenagogue.[2] It has been given in the form of infusion in nervous head-ach, hysteria, and chlorosis, but it is now scarcely ever prescribed, unless as an odorous adjunct to sternutatory powders. The dose in substance may be from grs. x to ℈ij; and from ʒj to ʒiſs, in infusion.

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[1] Διβανωτις Dioscoridis.

[2] *Bergius, Mat. Med. a Regno Veget.* p. 21.

Officinal preparations. *Oleum Rosmarini.* L. E. D. *Spiritus Rosmarini.* L. E. D.

RUBIA. *Spec. Plant. Willd.* i. 603.

Cl. 4. *Ord.* 1. Tetrandria Monogynia. *Nat. ord.* Stellatæ *Linn.* Rubiaceæ *Juss.*

G. 187. *Corolla* of one petal, bell-shaped. *Berries* two, one-seeded.

Species 1. R. *tinctorum.*[1] Dyers' Madder. *Med. Bot. 2d edit.* 173. *t.* 67.

Officinal. RUBIÆ RADIX. *Lond. Dub.* RUBIÆ TINCTORUM RADIX. *Edin.* The root of Dyers' Madder.

Syn. Garance (*F.*) Krappwurzel; Færberrothe (*G.*) Radiche di Robbia o Garanza (*I.*) Rubia (*S.*) Munjith (*H.*) Mantjtittie (*Tam.*)

This plant is a perennial, with annual stems. It is a native of the south of Europe, the Levant, and Africa; and has been cultivated to a very great extent for upwards of 300 years in Zealand: it flowers in June.[2] The root is composed of many long, thick, succulent fibres, about the thickness of a man's finger, united at the top in a head; from which go off many side roots, extending under the surface of the ground, and throwing up shoots, by which the plant may be propagated. The stems are quadrangular, jointed, procumbent, and furnished with rough, short, hooked points, by which they are supported on the neighbouring plants. The leaves, which are in whorls of four or five, are elliptical, pointed, rough, and ciliated, about three inches long, nearly one broad in the middle; and having the midribs armed with the same kind of spines as on the stems. The branches bearing the flowers spring from the joints of the stems. The flowers are small, terminal, with a campanulate yellow corolla, cut into four oval segments: the filaments short, supporting simple erect anthers; and the germen is inferior and double, crowned with a slender style bearing two globular stigmas; and becoming two round black berries.

Madder root is dug up for use in the third summer of its growth. It is then dried gradually in a stove built in the form of a tower, containing several floors; and from the uppermost it is progressively removed to the lowest; after which it is thrashed, to remove the cuticle; and then dried completely in a kiln. When perfectly dried it is pounded, and finally packed in barrels for the market. There are three descriptions of this powder. The first pounding separates and reduces to a powder the fibrillæ, and the skins of the larger roots only, which is sold at a low price, under the name of *mull;* a second pounding separates one-third of the remaining parts of the large roots, and is sold under the name of *gemcens:* and a third pounding forms into a powder the pure, bright residue of the roots, which is the best; and is simply called *crop* madder.[1]

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[1] Ερευθροδανον Dioscoridis.

[2] As madder is an article of great national importance as a dye-stuff, many attempts have been made to cultivate it in this country, but without success, the Dutch madder being both better and cheaper than ours. That it can be grown to great perfection in this country is certain, and the effort to introduce its culture should not be dropped. The best comes from Zealand; to which, Britain alone is said to have paid 200,000*l.* annually for madder. *Bancroft on Permanent Colours,* 2d edit. v. ii. p. 222.

Qualities.—Madder has an unpleasant but not strong odour, and a bitter slightly austere taste. It attracts the moisture of a damp atmosphere, and is injured by it. To water, alcohol, and volatile oils, at a temperature of 60°, it imparts a red colour; but to water at 212° the colour imparted has a deep tinge of brown. Its principal constituent is extractive; which is precipitated by solution of alum brownish red; by the alkaline carbonates and lime-water, blood-red or lake; and by acetate of lead, brown.[2] The taste and odour of the madder are imparted to water and alcohol by infusion.

Medical properties and uses.—Madder is usually regarded as emmenagogue; and was formerly much relied on in chlorosis and scanty and difficult menstruation. It has also been recommended in jaundice, and the atrophy of infants: but its efficacy in any disease is extremely problematical. Its colouring matter, however, is carried into the circulation, tinges the urine a blood-red colour, and is deposited in the bones.[3]

The dose of madder may be from grs. xv to ℈j, united with sulphate of potash; and given three or four times a day.

RUMEX. *Spec. Plant. Willd.* ii. 249.

Cl. 6. *Ord.* 2. Hexandria Digynia. *Nat. ord.* Holoraceæ *Linn.* Polygoneæ *Juss.*

G. 699. *Calyx* three-leaved. *Petals* three, converging. *Seed* one, three-sided.

** *Hermaphrodites: with naked valves, or not marked with a grain.*

Species 18. R. *aquaticus.* Great Water-dock. *Smith Flora Brit.* 394. *Med. Bot. 2d edit. t.* 299.

*** *with diclinous flowers.*

Species 31. R. *acetosa.* Common Sorrel. *Med. Bot. 2d edit. t.* 230. *Smith Flora Brit.* 396.

1. RUMEX AQUATICUS.

Officinal.——; RADIX. *Dub.* The root of Water-dock.

Syn. Wasser Ampfer (*G.*)

Water-dock is an indigenous, perennial plant, growing in ditches, and on the banks of rivers; flowering in July and August. The root is thick. The stem rises about five feet in height, straight, furrowed, and smooth. The leaves are almost glaucous, lanceolate, and pointed; and the lower ones obcordate at the base. The flowers are in approximate whorls. They are nodding, on capillary pedicles, thickened at the apex. The valves are large, ovate, veined, entire, sometimes a little toothed, and all marked with a small linear, often obscure grain: the seed is large.

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[1] *Bancroft,* l. c.

[2] *Annales de Chimie,* iv. 104.

[3] Vide *Phil. Trans.* xxxix. 287—299. The leaves of the plant are said to tinge the milk of cows reddish, when eaten by them.

Qualities.—The root is nearly inodorous, and has a very austere taste. It yields its virtues to water.

Medical properties and uses.—Water-dock root is powerfully astringent. It was formerly celebrated under the name *Herba Britannica*, as a remedy for scurvy, and some cutaneous affections; but it is now scarcely ever employed.

2. RUMEX ACETOSA.

Officinal. ACETOSÆ FOLIA. *Lond.* RUMICIS ACETOSÆ FOLIA. *Edin.* Common Sorrel leaves.

Syn. Oseille ordinaire (*F.*) Sauer Ampfer (*G.*) Acetosa (*I.*) Acedera (*S.*)

This is an indigenous perennial plant, common in pastures, and flowering in June. The stem is round, striated and leafy, and rises from one to two feet in height. The leaves are oblong-ovate, and arrow-shaped; the radical ones petiolate and obtuse; and those of the stem sessile, amplexicaule, pointed, and a little rolled back. The flowers are dioecious, in branched panicles, and arranged in half whorls: the calyx and corolla small; the stamens very short, bearing large yellow anthers, and the styles short, with large crimson-bearded stigmas. The valves are ovate, entire, and graniferous.

Qualities. — Sorrel leaves are inodorous, and have a grateful austere acidulous taste, depending on the presence of superoxalate of potash, which they contain.

Medical properties and uses. — These leaves are refrigerant and diuretic. Their expressed juice diluted with water, or a decoction of them in whey, affords a useful drink in cases of inflammatory fever; and eating them in large quantities daily as a salad, may prove serviceable in some cutaneous affections. In France the plant is cultivated for the use of the table.

RUTA. *Spec. Plant. Willd.* ii. 542.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Multisiliquæ *Linn.* Rutaceæ *Juss.*

G. 827. *Calyx* five-parted. *Petals* concave. *Receptacle* surrounded by ten melliferous points. *Capsule* lobed.

Sp. 1. R. *graveolens.*[1] Common Rue. *Med. Bot. 2d edit.* 437. *t.* 174.

Officinal. RUTÆ FOLIA. *Lond. Dub.* RUTÆ GRAVEOLENTIS HERBA. *Edin.* The leaves and herbaceous part of Rue.

Syn. Ruë sauvage (*F.*) Raute, Garten raute (*G.*) Ruta (*I.*) Ruta de derpesado (*S.*) Suddāp (*Arab.*) Saturi (*H.*)

Rue is an evergreen perennial, a native of the South of Europe, but much cultivated in our gardens, flowering in June and September. It rises to the height of two or three feet, shrubby and branching, with the lower part of the stems ligneous, and covered with a rough, striated, gray bark; but the upper branches are smooth, and of a pale green colour. The leaves are doubly pinnate; the pinnæ distant; and the leaflets obovate, sessile, decurrent, and very obscurely crenate, with the terminal one generally notched; the surface punctured, the texture rather thick, and the colour blueish green or glaucous. The flowers are produced in terminal branched corymbs on subdividing peduncles. The flower which opens first has a five-parted calyx, and a five-petalled corolla; but the others have the calyx four-parted only, and a four-petalled corolla. The petals are concave, wrinkled at the edge, of a pale greenish yellow colour, and very much spread: the stamens are awl-shaped, the length of the petals, and bearing small yellow quadrangular anthers.[1] The germen is large, oval, punctured, deep green, with crucial furrows, and crowned with a short style and simple stigma: and the seeds are angular, rough, and blackish.

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[1] 'Ρυτη-κηπαιον Dioscoridis.

Qualities.—Rue leaves have a powerful unpleasant odour, and a hot, bitter, nauseous taste. In the recent state, the leaves possess so much acrimony as to inflame and blister the skin; but much of this is dissipated in drying. In distillation with water they yield a pungent volatile oil, on which their virtues chiefly depend: consequently, decoction is a bad form of preparation of rue.

Medical properties and uses.—Rue is stimulant, and antispasmodic; and is supposed to possess emmenagogue powers. It was in high estimation so early as the time of Hippocrates, who frequently ordered it in female complaints.[2] In modern practice it is chiefly used in hysteria and flatulent colic. I have found a strong infusion of it, exhibited per anum, of great service in relieving the convulsions of infants, arising from flatulence and other intestinal irritations. The dose of the powdered leaves is from grs. xv to ℈ij, given twice or three times a day.

Officinal preparations. *Oleum Rutæ.* D. *Extractum Rutæ graveolentis.* E. D.

SABINÆ FOLIA. Vide *Juniperus.*

SACCHARUM. *Spec. Plant. Willd.* i. 122.

Cl. 3. *Ord.* 2. Triandria Digynia. *Nat. ord.* Gramina.

G. 122. *Calyx* two-valved, involucred, with a long lanugo. *Corolla* two-valved.

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[1] These stamens display in a striking manner the spontaneous motions which take place in some plants. They are very stiff, and cannot be disturbed from the posture in which they happen to be; but nevertheless they rise, by a spontaneous movement, one or two at a time, and lean over the stigma till the pollen be shed, when they fall back again, and give place to others.

[2] *De Morbis Mulier.*

Spec. 4. S. *officinarum*. Common Sugar-Cane. *Sloane's Jamaica*, i. 101. *t.* 66. *Phil. Trans.* lxix. 207—278. *t.* 3.

Officinal. SACCHARUM. SACCHARUM PURIFICATUM. *Lond.* SACCHARUM. a. *non purificatum*. b. *purificatum*. c. *syrupus empyreumaticus*. Edin. SACCHARUM PURIFICATUM; SACCHARUM RUBRUM, EJUSDEMQUE SYRUPUS. (Molasses.) *Dub.* Unrefined Sugar. Refined Sugar. Molasses.

Syn. Sucre; Sucre-pur (*F.*) Zucker; Weisser Zucker (*G.*) Zucchero brutto; Zucchero in pane; Melassa (*I.*) Azucar; Atriaca (*S.*) Shukhir (*Arab.*) Chenee (*H.*) Sakkara (*San.*)

The common sugar-cane is a native of both the East and West Indies. It is cultivated in Persia, and very abundantly in the West Indies. The root is jointed, and sends up several jointed stems, which rise in general to the height of eight or ten feet. A leaf springs from each joint, and the base of it embraces the stem to the next joint above its insertion, before it expands. From this point each leaf is about three or four feet long, and comparatively narrow, like a blade of grass; with the midrib broad, and prominent on the under side, and the edges thin, and sharply toothed. The flowers are in terminal panicles, two or three feet in length, and composed of subdivided spikes, with long flexuose down or lanugo, which incloses the flowers, and hides them from the sight. The seed is oblong-pointed, and ripens in the valves of the flowers.

Although the sugar-cane is undoubtedly a native of the American continent and its islands, yet the culture of it, and the art of making sugar, were carried from Spain to the Canary Islands, and thence extended, about the end of the fifteenth century, to the West Indies and the Brazils; the former of which supplies the greater part of the consumption of Europe[1], a small proportion only being brought from the East Indies. The quantity of sugar yielded by the plant is varied by climate: thus, the Otaheitean cane contains more crystallized matter than that of any other place.

In the West Indies the plant is propagated by cuttings of the stalk, taken from near its top, and laid horizontally in the ground. The canes are cut, for the purpose of making sugar, between the sixth and thirteenth month of their growth, when the stems have acquired from seven to ten feet in height, a proportionable size, and the cuticle appears smooth, dry, and brittle. This generally happens in the months of February, March, and April. As soon as they are cut, the canes are stripped of their leaves, and crushed between iron rollers, to express the juice, which is received into large leaden vessels, called *receivers*, whence it is immediately conveyed into a large copper vessel, named the *clarifier*, where it is mixed with lime, in the proportion of one pint to 100 gallons of juice, and heated to the temperature of 140°.[1] A thick scum soon forms on the top, from under which the clear liquor is drawn off by a cock into a large copper boiler, where it is boiled till the bulk of the liquor is very considerably diminished. The boiling is successively repeated in four other coppers progressively smaller; and from the last, which is called the *teache*, it is conveyed into shallow wooden coolers, where it grains, and the concreted mass separates from the uncrystallizable matter or molasses. This mass is then put into empty hogsheads, having holes in the bottom, through each of which the stalk of a plantain-leaf is thrust; and when the molasses has drained off, the process is finished. In this state the sugar is brought home, under the name of *raw*, or *muscovado* sugar. In Europe, however, sugar undergoes another process for its purification. It is coarsely ground, dissolved in lime-water, and clarified with bullocks' blood; then boiled down to a proper consistency, the impurities being skimmed off as they rise, and poured into conical earthen vessels, where it is allowed to grain. The point of the cone is perforated; and the base covered with moist clay, the moisture of which percolates the sugar, and runs off through the perforated apex, which is placed undermost, carrying with it any uncrystallized impure syrup. In this state it is called *loaf* sugar; and requires a second purification before it is considered as completely *refined* sugar.

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[1] The average importation into England and Scotland between 1787 and 1790, amounted annually to 1,952,262 cwt. *Moseley's Hist. of Sugar*, p. 154.

Qualities. — *Raw* or *muscovado* sugar is inodorous, and sweet to the taste. It is in concreted masses, consisting of small, dry, sparkling, irregular crystals of a yellowish colour. *Refined sugar* is also inodorous, and sweet to the taste. Its colour is pure white; and the mass or loaf in which it is concreted should be hard, extremely brittle, pulverulent, and persistent in the air. One hundred parts of sugar in its ordinary state contains, according to Berzelius, 5·3 of water: and it requires its own weight only of water at 48° for its solution. When united at a higher temperature with a smaller quantity of water, it remains dissolved, forming syrup. Four parts of boiling alcohol dissolve one part of sugar; but by rest a moiety of the sugar again separates in crystals. Oils also readily combine with it, and the mixture is miscible with water. Lime and the fixed alkalies unite with sugar, and form compounds, without any sweetness of taste. The concentrated strong acids dissolve and decompose sugar, but the weaker simply dissolve it; and the alkaline and earthy hydro-sulphurets, sulphurets, and phosphurets, decompose it, and resolve it into a substance resembling gum.[1] Its ultimate constituents, according to the experiments of Lavoisier, are, 64 oxygen, 28 carbon, and 8 hydrogen, in 100 parts[2]: but according to Thenard and Guy Lussac, the proportions are oxygen 50·63, carbon 42·47, hydrogen 6·90, with which the last analysis of Berzelius nearly coincides.

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[1] The lime extricates carbonic acid from the juice, and forms with the *herbaceous* or feculent matter an insoluble compound, which rises to the surface, and forms the scum.

Molasses has a peculiar odour, and a sweet empyreumatic taste. It is of a brown or black colour, thick, and viscid; and is constituted chiefly of the uncrystallizable part of the juice of the sugar cane, which Proust has denominated liquid sugar. It is more soluble in alcohol than sugar.

Medical properties and uses. — Raw sugar and molasses are laxative; and refined sugar externally applied is escharotic. All the kinds are extremely nutrient, and more generally used as articles of diet than for medicinal purposes; except it be to cover the taste of nauseous drugs. Sugar, however, is said to be a preventive of worms; and to prove useful in scurvy: but it is hurtful to those of bilious, hypochondriacal, and dyspeptic habit. But perhaps the most important use of sugar is as an antidote to the poison of verdegris. It requires to be given in large quantities, both in the solid form and in solution in water. It appears to act chemically on the poison, and also by increasing the peristaltic action of the bowels.[3]

Officinal preparations. *Syrupi omnes.* L. E. D. *Trochisci omnes.* E. *Confectiones omnes.* L.

SAGAPENUM. *Lond. Edin. Dub.* Sagapenum.

Syn. Sagapenum (*F.*) Sagapengummi (*G.*) Sagapeno (*I.*) Sugbeenuj (*Arab.*) Kundel (*H.*)

This gum-resin which is brought to this country from Smyrna, Aleppo, and Alexandria, is the concrete juice of an unknown Persian plant. Dioscorides mentioned it as the juice of a ferula growing in Media[4]; and nothing more is known of its source at this day, although Willdenow supposes it to be the *Ferula persica.*[5]

Qualities. — Sagapenum has an alliaceous odour, and a hot, acrid, bitterish taste, not unlike that of asafœtida, only weaker. It is in agglutinated drops or masses, of an olive, or brownish yellow colour, slightly translucent, and breaking with a horny fracture. It softens and is tenacious between the fingers; melts at a low heat, and burns with a crackling noise and white flame, giving out abundance of smoke, and leaving behind a light spongy charcoal. Water and strong alcohol dissolve it partially; but it is almost completely soluble in proof spirit. In distillation with water it yields a little volatile oil; and impregnates the water strongly with its flavour. Its constituents appear to be gum, resin, and an essential oil, on which its virtues probably depend.

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[1] *Rollo on Diabetes*, 452. *Thomson's Chemistry*, 4th ed. vol. iv. 660.

[2] A sugar in every respect resembling common sugar is obtained from the maple.

[3] Vide *Traité des Poisons, &c.* Par M. P. Orfila, tom. i. p. 281.

[4] *Dioscorides*, lib. 3. c. 95. (Σαγαπηνον.)

[5] This plant was fully described by Dr. Hope, as the plant which yields the asafœtida, which, however, is the produce of another species. See *Phil. Trans.* lxxv. 36. *t.* 3, 4.

Medical properties and uses. — This gum-resin is antispasmodic, and emmenagogue; and externally discutient. It is sometimes employed in hysteria, chlorosis, and other cases in which asafœtida has been found serviceable; but it is much inferior in its powers. It is usually given in substance, in doses of from grs. x. to ʒſs. made into pills.

SALIX. *Spec. Plant. Willd.* iv. 703.

Cl. 22. *Ord.* 2. Dioecia Diandria. *Nat. ord.* Amentaceæ.

G. 1756. Male. *Amentum* cylindrical. *Calyx* a scale. *Corolla* none. *Gland of the base* nectariferous.

Female. *Amentum* cylindrical. *Calyx* a scale. *Corolla* none. *Style* bifid. *Capsule* one-celled, two-valved. *Seeds* downy.

* *with smooth serrated leaves.*

Species. 10. S. *fragilis.* Crack Willow. *Smith Flora Brit.* 1051. *Med. Bot. 2d edit.* 18. *t.* 8. *Hoffman Sal.* ii. 9. *t.* 31.

*** *with villose leaves.*

Species. 33. S. *alba.* White Willow. *Smith Flora Brit.* 1071. *Hoffman Sal.* i. 41. *t.* 7, 8.

Species 101. S. *caprea.* Great round leaved Sallow. *Smith Flora Brit.* 1067. *Hoffman Sal.* i. 25. *t.* 3. *f.* 1.

1. SALIX FRAGILIS.

Officinal. —— CORTEX. *Dub.* Bark of the Crack Willow.

Syn. Ecorce de Saule (*F.*) Weidenrinde (*G.*) Corteccia di Salcio (*I.*) Corteza de sauce (*S.*)

This species of willow is indigenous, growing upon the banks of rivers, and flowering in April and May. It grows to a considerable height, sending off upright branches; which are covered with an even brownish yellow bark, and are very fragile at the base. The leaves are petiolate, from three to five inches in length, lanceolate, pointed, obtusely serrated, inflected, and glandular; smooth on both surfaces, shining on the upper; and in the younger ones, ciliated at the apex. There are sometimes no stipules; but when present they are rounded, and obscurely toothed. The male catkin is pale, cylindrical, rather lax, with ovate, downy scales. The nectary is composed of two yellow glandular scales, the larger between the stamen and the receptacle, and the smaller between the stamen and the scale. The stamens are two, filiform, and smooth. The female catkin resembles the male; with the germen egg-shaped, supporting two bifid, erect stigmas. The capsule is ovate, and contains many small seeds. The bark requires to be dried in an oven moderately heated.

Qualities. — The dried bark is inodorous, bitter and austere.

2. SALIX ALBA.

Officinal. SALIX; CORTEX. *Dub.* Willow Bark.

The white willow is indigenous, growing in woods and moist places, and flowering in April and May. It is a large tree, with a cracked bark; and furnished with many round, spreading branches; the younger of which are silky. The leaves are alternate, on short petioles, lanceolate, pointed, acutely and regularly serrated, with the lower serratures remote and glandular: pubescent on both sides, and silky beneath: the younger ones are altogether silvery, and convoluted. There are no stipules. The catkins are terminal, cylindrical, elongated, slender, and many flowered, with elliptical, lanceolate, brown, pubescent scales. The stamens are yellow, and a little longer than the scales: the style is short; and the stigmas bipartite and thick. The capsules are nearly sessile, ovate, brownish, and smooth.

The bark of this species is easily separated all the summer. It has been used for tanning leather; and the inner part of it affords the miserable inhabitants of Kamschatka a substitute for bread.

Qualities. — The same as those of the former species.

3. SALIX CAPREA.

Officinal. SALICIS CORTEX. *Lond.* Willow Bark.

This species of willow is indigenous, very common in woods, flowering in April. It is a middling-sized tree, with the branches round, even, shining, and brownish; and the shoots pubescent. The leaves are alternate, petiolate, and varying in shape, being sometimes elliptical or roundish, pointed, large, undulated, waved, or serrated; smooth and dark green on the upper surface, and densely tomentose and veined on the under. The stipules are crescent-shaped or roundish, recurved, waved, and tomentose. The petioles are linear, and densely villose. The catkins appear before the leaves, are ovate, thick, many-flowered, with obovate, very hairy scales. The stamens are yellow: the stigmas nearly sessile, undivided, but at last occasionally cleft. The capsules are pedicelled, ovate, bellied at the base, and downy.

Qualities. —The bark of this species, like that of the two former, is inodorous, bitterish, and astringent.

The bark of the white willow only has been chemically examined; but as the other two species agree with it in their sensible qualities, it is probable that they agree also in other respects. Water extracts its virtues, and affords a decoction of a reddish colour, which is precipitated by a solution of isinglass, the carbonate of potash and of ammonia; and by lime-water, which throws down a precipitate at first blue, and afterwards buff-coloured: sulphate of iron also produces a dark green precipitate. The watery extract is reddish, brittle, has a bitter taste, and does not deliquesce. Digested in alcohol this bark affords a greenish yellow tincture, which water renders turbid. When evaporated, the extract is of a bright yellow colour, bitter, melts at a moderate heat, and emits an aromatic odour.[1] The constituents, therefore, of white willow bark, and probably of the two other species also, are tannin, bitter resin, extractive, and gluten.

Medical properties and uses. — These barks are tonic, and astringent. They have been given as a substitute for the cinchona bark; and in some cases intermittents and remittents have yielded to their use.[2] They have also been efficaciously administered in cases of debility, dyspepsia, and pulmonary hemorrhagies; and have apparently been more serviceable in phthisis and hectic fever than the cinchona. They may be given either in substance, or in the form of decoction. Of the powdered bark from ʒſs. to ʒj. may be given for a dose, combined with aromatics, myrrh, or the cinchona bark, as circumstances direct.

SALVIA. *Spec. Plant. Willd.* i. 127.
Cl. 2. *Ord.* 1. Diandria Monogynia. *Nat. ord.* Verticillatæ *Linn.* Labiatæ *Juss.*
G. 63. *Corolla* unequal. *Filaments* affixed transversely to a pedicel.
Species 7. S. *officinalis.*[3] Garden Sage. *Med. Bot. 2d ed.* 352. *t.* 127.
Officinal. SALVIÆ OFFICINALIS FOLIA. *Edin.* SALVIA. *Dub.* The leaves of Sage.
Syn. Sauge (*F.*) Salbei (*G.*) Salvia (*I.*) Salvia (*S.*) Says-elley (*Tam.*) Saulbēy (*Pers.*)

The common or officinal sage is a perennial plant, a native of the South of Europe, cultivated abundantly in our gardens, flowering in June. It rises about two feet in height, with a quadrangular, shrubby, branching stem: the younger branches whitish, and downy. The leaves, which stand in pairs on footstalks, are ovate-lanceolate, wrinkled, crenate, and sometimes tinged reddish or purple. The flowers are on long terminal spikes, in six-flowered distant whorls, accompanied with ovate, acute, deciduous bractes. The calyx is striated, purplish on the upper part, and notched into three acute teeth above, and two below: the corolla is tubular and bilabiate, of a beautiful blue variegated with purple and white; the upper lip obtuse, notched, and concave, the under three-lobed, the lateral lobes bent backwards. The filaments are affixed transversely at their middle to short pedicels, on a moveable axis, and are curved threads bearing a gland on the lower end, and on the upper a yellow oblong anther: the style is long, curved, purple with a bifid stigma, and rising from the centre of four naked seeds in the bottom of the calyx.

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[1] *Ann. de Chimie.* liv. 290. *Thomson's Chemistry*, 4th ed. vol. v. p. 221.

[2] The bark of the white willow was first used by the Rev. Edmund Stone, of Chipping Norton, Oxfordshire. He gave it successfully in doses of one drachm of the powder every hour between the paroxysms, in tertians; and added one-fifth of Peruvian bark to augment its power, in obstinate quartans. *Phil. Trans.* iii. 195.

[3] Ελιλισφακον Dioscoridis.

There are many varieties of common sage, but their properties are the same. It is cut when in flower, and hung up in a shady place to dry.

Qualities.— The odour of sage is fragrant, and the taste warm, bitterish, and aromatic: qualities depending on an essential oil which can be obtained separate in distillation with water. Sulphate of iron strikes a deep black colour with the infusion.

Medical properties and uses. — Sage is tonic, carminative, and slightly astringent. The estimation in which it was held by the antients is sufficiently well known; but it does not support the character it formerly acquired; and "salvia salvatrix naturæ conciliatrix"[1] is very little regarded by the modern practitioner. Infusions of the leaves, if strained before too much of the bitter is extracted, prove very grateful to the stomach, when nausea is troublesome in febrile complaints; and when drunk cold they are said to check hectical perspirations[2], and those which frequently attend convalescencies. The infusion either alone, or mixed with honey and vinegar, is a well known gargle in cases of sore throat, and relaxation of the uvula. The dose of the pulverized leaves is from grs. xv. to ʒſs; or, of an infusion made with ℥j of the dried leaves and Oj of boiling water, f℥ij may be taken every three or four hours.

SAMBUCUS. *Spec. Plant. Willd.* i. 1494.

Cl. 5. *Ord.* 3. Pentandria Trigynia. *Nat. ord.* Dumosæ *Linn.* Caprifoliæ. *Juss.*

G. 569. *Calyx* five-parted. *Corolla* five cleft. *Berry* three-seeded.

Species 3. S. *nigra.*[3] Common Elder. *Med. Bot. 2d ed.* 596. *Smith Flora Brit.* 336. *Engl. Bot.* 476.

Officinal. SAMBUCI FLORES. *Lond.* SAMBUCI NIGRÆ FLORES; BACCÆ CORTEX. *Edin.* SAMBUCUS; CORTEX INTERIOR, FLORES, BACCÆ. *Dub.*

The flowers, berries, and inner bark of Common Elder.

Syn. Sureau ordinaire (*F.*) Fliederblumen (*G.*) Corteccia; bacche, e fiori di Sambuco (*I.*) Sabuco (*S.*) Uktee (*Arab.*)

The common elder is a very abundant, indigenous, middle-sized shrubby tree, growing commonly in hedges; flowering in June, and ripening its berries in September. It is much branched near the top, and covered with a roughish gray bark.

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[1] *Schola Saleritana*, c. 38, p. 406.

[2] *Van Swieten's Comment.* ii. 370.

[3] Ακτη Dioscoridis. The leaves laid in the subterraneous passages of moles are said to drive them away.

The wood is white, hard, and has a large spongy pith. The leaves are pinnated, composed of five oval, pointed, serrated leaflets, nearly equal at their base. The flowers are in terminal cymes, consisting of five principal branches, and many small ones, with some of the flowers sessile. They are cream-coloured; with the calyx superior, and permanent, and the corolla monopetalous, rotate, and somewhat convex. The berries are globular, and when ripe of a purplish black colour.

Qualities. — The *flowers* have a peculiar faint sickly odour and bitterish taste, which are imparted to water by infusion, and also by distillation, in which a small portion of butyraceous oil is separated. The *berries* are inodorous, have a sweetish taste; and yield on expression a fine purple juice, which contains saccharine matter, jelly, and the malic acid. The *inner bark* is inodorous, and has a faint sweetish taste, which is succeeded by a slight bitterness, and a very permanent acrimony. Both water and alcohol extract their virtues.

Medical properties and uses. — The flowers and berries are diaphoretic and aperient. The berries were formerly much used in febrile diseases, rheumatism, gout, and eruptive diseases, but they are now scarcely ever ordered. The flowers are used chiefly in fomentations and cooling ointments; and to afford their odours to water in distillation. The bark is a hydragogue purgative, and in large doses proves emetic at the same time. It is said to prove useful in dropsy; and in smaller doses to be a useful aperient and deobstruent in various chronic affections. The dose of the bark is from grs. x. to ʒſs. given in wine: or ℥j may be boiled in Oij of milk or of water down to Oj, and the fourth part taken for a dose.

Officinal preparations. *Succus spissatus Sambuci nigræ.* **E. D.** *Unguentum Sambuci.* **L. D.**

SAPO. Soap.[1]

Soap is a compound of margaritic and oleic acids[2] with an alkaline, or an earthy, or an oxidized metalline base. The first kind is that which is employed in medicine, and has been longest known, having been invented by the Gauls at a period antecedent to historical record. Alkaline soap is of two kinds; one made with soda, and oil either animal or vegetable, or tallow, and called *hard soap;* the other made with potash and similar oily matters, and called *soft soap.* For medical purposes it is essential that both kinds be made from the purest materials; and therefore the soap made in countries which produce olive oil, as the south of France, Italy, Tripoli and Spain, is preferable to the soap of this country, which is generally manufactured from grease, tallow, and other kinds of fat.

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[1] The name is derived, according to Beckman, from the old German word *Sepe.* — *History of Inventions*, iii. 239.

[2] *Chevreul*, whose experiments have elucidated the nature of soap more than those of any other chemist, has ascertained that fixed oils and tallow consist of two substances, one solid, which he has named *steärin*, and the other fluid, which he has named *eläin*. These are altered by salifiable bases, and converted into the above named acids, vide *Ann. de Chimie et de Phys.*

1. HARD SOAP.

Officinal. SAPO DURUS. *Lond.* SAPO DURUS; *et soda confectus.* Edin. SAPO; DURUS HISPANICUS. *Dub.* Hard Soap. Spanish Soap.

Syn. Savon blanc (*F.*) Spanische Seife (*G.*) Sapone duro (*I.*) Xabon (*S.*) Nāt Sowcārum (*Tam.*) Sāboon (*Duh.*)

Hard soap is manufactured in Spain in the following manner: To five parts of barilla, coarsely ground to powder, one part of quicklime rendered fluid with a small portion of water, is added; and after some time the clear liquor, which is a strong solution of caustic soda, is drawn off, and called the *first ley*; with the residue more water is then mixed, and drawn off after some time, and called the *second ley*; and a *third ley* is procured by another portion of water treated in a similar manner. This last ley is then mixed with a quantity of olive oil equal in weight to the barilla employed, and the mixture boiled in an iron vessel, the second ley and a portion of the first being added in a gradual manner during the boiling. The boiling mixture is constantly stirred with a wooden pole, and when it becomes tolerably thick, a small portion of common salt is added, and the boiling continued for half an hour. The fire is then damped, and after some hours the clear liquor, which has separated, is drawn off, and the half-made soap again boiled with a little fresh water and the residue of the first ley. After the separation of the fluid of this boiling, it is again heated with a little water, and then poured into wooden vessels called frames, where it cools, and in a few days acquires a sufficient degree of hardness. Three parts of oil and three parts of soda produce five parts of firm soap.[1] Castile soap is made in the same manner, except that the marbled appearance which it presents is produced by the addition of sulphate of iron to a part of the alkaline ley, after the soap is fully boiled, which gives the blue colour; and the stirring in red oxide of iron, when the soap is almost made, gives the red colour.

Qualities. — Well made hard soap, fit for medical use, has very little odour, and a nauseous alkalescent taste; is white, and of a firm consistence, does not feel greasy, and is devoid of any saline efflorescence on the surface. With water it forms a milky opaque solution; and with alcohol a nearly transparent, somewhat gelatinous solution.[2] It is decomposed by all the acids, and by many neutral salts; hence hard water, which contains sulphate of lime, does not properly dissolve soap. According to the experiments of Darcet, Lelievre, and Pelletier, 100 parts of newly-made soap consist of 60·94 oil, 8·56 alkali, and 30·50 water: but part of the water is lost by keeping, and the soap becomes lighter.

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[1] *Annales de Chimie*, xix. 253.

[2] The alcoholic solution of soap is a convenient test for discovering earthy salts in mineral waters.

2. SOFT SOAP.

Officinal. SAPO MOLLIS. *Lond. Edin.* Soft Soap.

Syn. Savon Moû (*F.*) Sapone Molle (*I.*)

This soap is prepared in the same manner as the former, a caustic ley of potash, however, being used instead of the soda ley. It was this variety of soap which was originally made by the Gauls and Germans, who employed wood ashes to afford their ley; and these are still used in many places.

Qualities.—Soft soap differs from hard soap chiefly in its consistence, which is never greater than that of hog's lard.

Medical properties and uses. — Soap is regarded as purgative and lithontriptic; externally applied it is stimulant and detergent. For internal use the hard soap only is employed. It is occasionally ordered in habitual costiveness, and in jaundice, combined with rhubarb, or some bitter extract; but its power as a purgative is very limited, and it cannot act in any other way in relieving jaundice. It is more useful in calculous habits, in which, however, its action is altogether confined to the stomach; for as soap is decomposed by the weakest acids, its alkaline base corrects the acidity so prevalent in the stomachs of calculous patients, and thus at least assists in checking the increase of the disease. Soap is also beneficial in decomposing some metallic poisons when taken into the stomach; and, as it is the antidote which can most readily be procured, should always be early resorted to. It is necessary, in this latter case, to give it in solution; of which a teacupful should be drank at short intervals, till the effects expected from it be produced. In other cases it is preferable to give it in substance. As an external remedy, soap is efficaciously used in frictions to sprains and bruises; and we have seen much benefit derived from rubbing the tumid bellies of children labouring under mesenteric fever, with a strong lather of soap every morning and evening. The dose internally is from grs. v. to ʒſs. made into pills.

Officinal preparations. *Pilulæ Saponis cum Opio.* L. *Emplastrum Saponis.* L. E. *Ceratum Saponis.* L. *Linimentum Saponis comp.* L. *Linimentum Saponis cum Opio.* E.

SARSAPARIL'LÆ RA'DIX. Vide *Smilax.*

SAS'SAFRAS LIG'NUM ET RA'DIX. Vide *Laurus.*

SCAMMO'NIÆ GUM'MI RES'INA. Vide *Convolvulus.*

SCILLA. *Spec. Plant. Willd.* ii. 125.

Cl. 6. *Ord.* 1. Hexandria Monogynia. *Nat. ord.* Coronariæ *Linn.* Asphodeli *Juss.*

G. 640. *Corolla* six-petalled, spreading, deciduous. *Filaments* threadlike.

Species 1. S. *Maritima.*[1] Officinal Squill. *Med. Bot. 2d ed.* 745. *t.* 255.

Officinal. SCIL'LÆ RA'DIX. *Lond. Dub.* SCILLÆ MARITIMÆ RADIX.[2] *Edin.* Squill root (bulb.)

Syn. Scille (*F.*) Meerzwiebel (*G.*) Scilla (*I.*) Cebolla abarruna (*S.*)

This species of squill is a native of Spain, Sicily, Syria, and Barbary, flowering in April and May. The bulb is large, sometimes nearly the size of the human head, of a pear shape, and formed of fleshy scales, attenuated at both edges, and closely applied one over the other. The roots are fibrous, attached to a radical plate at the bottom of the bulb. The stem is round, smooth, and succulent, rising about three feet in height, from the centre of several radical, sword-shaped, straight, pointed, long leaves of a deep green colour. The flowers are produced in a long close spike upon purplish peduncles, with a linear, twisted deciduous bracte at the base of each. The corolla consists of six white ovate spreading petals, with a reddish mark in the middle of each: the filaments are shorter than the corolla, tapering, and furnished with oblong transversely placed anthers: the germen is roundish; the style and stigma are simple; and the capsule is oblong, smooth, three-celled, and contains many roundish seeds.

There are two varieties of the officinal squill, one with a white bulb, and the other with a reddish bulb; but both are indiscriminately used, and do not differ in their virtues. The bulbs are brought from the Levant, generally in bulk. They are preserved fresh in sand; but as they are apt to spoil, it is preferable to keep them in the dried state. (See *Preparations.*)

Qualities.—The squill bulb is inodorous; its taste is bitter, nauseous, and acrid; and when much handled it inflames and ulcerates the skin. The expressed juice reddens slightly litmus paper. The acrimony on which its virtue depends is partially dissipated by drying and long keeping, and completely destroyed by any heat above 212°: it is extracted by water, alcohol, and vinegar. The expressed juice when diluted with water, filtered, and boiled, does not yield flakes of albumen as has been stated.[3] Nitrate of mercury and superacetate of lead separate from the juice white curdy precipitates. Gelatin throws down a copious precipitate: and in a less degree the same effect is produced by lime water and the alkaline carbonates. Infusion of galls forms in it pale brownish flakes; sulphate of iron throws down a copious green precipitate: lime evolves ammonia. When the insoluble part of dried squill is digested in muriatic acid, filtered, and ammonia added in excess, a copious precipitate is thrown down, which is citrate of lime. Ether digested on dried squill acquires a pale green hue, and when evaporated on the surface of water a thin pellicle of very bitter resinous matter is deposited; while the water acquires an intensely bitter taste, and yields copious precipitates with solutions of acetate of lead and nitrate of silver. From these imperfect experiments, squills appear to contain extractive, a small portion of resin, mucus, carbonate of ammonia, the bitter principle, and citrate of lime. Vogel, from a careful analysis of squill, gives the following as its principles: 1. Gum 6. — 2. Bitter principle (scillitena) 35. — 3. Tannin 24. — 4. Citrate of lime 0. — 5. Saccharine matter 6. — Woody fibre 30.[1]

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[1] Σκιλλη Dioscoridis. The trivial name *maritima* has been objected to, as it does not generally grow on the sea coast.

[2] All the Colleges have erred in designating the root as the officinal part of the squill. The bulb is the part employed.

[3] But when the expressed juice is boiled till one half is dissipated a white precipitate is thrown down, which, when washed with alcohol, appears to be citrate of lime. *Annales de Chimie,* vol. lxxxiii. p. 149.

Medical properties and uses.—Squill in small doses is expectorant and diuretic; in larger doses, emetic and purgative. Its medicinal powers were very early known, and it still retains its character as a remedy of great efficacy when judiciously exhibited. Although it operates powerfully as an expectorant, yet from its stimulating properties it cannot be given with propriety in pulmonary inflammations, until the fever and inflammatory action be previously greatly subdued by bleeding, and other evacuants; after which, by promoting a more copious excretion from the mucous follicles, it rapidly unloads the chest, and relieves the congestion and difficulty of breathing. It is more useful when combined with nitrate of potass, tartarized antimony, or ipecacuanha; and in asthma and dyspnœa without fever, squill combined with ammoniacum is perhaps the best remedy we can employ. In dropsies, conjoined with a mercurial and opium, the efficacy of squill is well ascertained. Its diuretic powers are much increased by this combination; perhaps depending on the absorbents being powerfully excited by the mercury, while the squill determines to the kidneys. Cullen recommends[2] the oxymuriate of mercury as the best adjunct; but I have seen every purpose answered by calomel. Squill is a very uncertain emetic, a very small dose producing the most cruel vomiting in some persons, while in others the largest doses do not even excite nausea: where, however, it readily and moderately induces vomiting, it proves more useful in hooping cough and croup, than any other emetic. To produce its expectorant and diuretic effects most effectually, squill must be given in substance; but to excite vomiting, its infusion in vinegar, or the oxymel, is more usually employed. Of the dried squill gr. j. in the form of a pill, may be given at first for a dose, morning and evening, or every six hours; gradually increasing the dose to grs. v. or grs. vj, or until some degree of nausea is induced, and its expectorant or diuretic operation obtained.

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[1] *Annales de Chimie*, vol. lxxxiii. p. 158.

[2] *Materia Medica*, ii. 558.

Officinal preparations. *Acetum Scillæ.* L. E. D. *Oxymel Scillæ.* L. D. *Pilulæ Scillæ comp.* L. E. D. *Pulvis Scillæ.* E. D. *Syrupus Scillæ maritimæ.* E. *Tinctura Scillæ.* L. D.

SCROPHULARIA. *Spec. Plant. Willd.* iii. 269.

Cl. 14. *Ord.* 2. Didynamia Angiospermia. *Nat. ord.* Personatæ *Linn.* Scrophulariæ *Juss.*

G. 1152. *Cal.* 5-cleft. *Corolla* subglobular, resupine. *Capsule* 2-celled.

Species 2. S. *nodosa.* Knobby-rooted Figwort. *Smith Flora. Brit.* 663. *Engl. Bot.* 1544.

Officinal. SCROPHULARIA; HERBA. *Dub.* Figwort herb.

This is an indigenous, perennial plant, growing in woods and about hedges, flowering in July. The root is tuberous, and granulated. The stem rises three feet in height, is erect, simple, sharply quadrangular, smooth, and leafy. The leaves are opposite, petiolate, cordate, pointed, serrated, veined, smooth, cut at the base to the lateral veins, and as if three-nerved. The flowers are in terminal bunches, erect, with the peduncles opposite, dichotomous, and bracteolated. The flowers are of a dark blood-red colour. The capsules ovate.

Qualities.—The recent leaves have a rank fetid odour, resembling that of elder, and a bitterish disagreeable taste; but, both these qualities are nearly lost by drying. They yield their virtues to water: and the infusion precipitates sulphate of iron brown.

Medical properties and uses.—Figwort is supposed to possess diuretic and sedative properties. It has been used in scrophula, whence its name; and is recommended as a fomentation to piles, malignant tumors, spreading ulcers, and cutaneous eruptions: but it is very little known in practice.

SENEGÆ RADIX. Vide *Polygala.*

SENNÆ FOLIA. Vide *Cassia.*

SERPENTARIÆ RADIX. Vide *Aristolochia.*

SEVUM. Vide *Ovis.*

SIMAROUBÆ CORTEX. Vide *Quassia.*

SINAPIS.[1] *Spec. Plant. Willd.* iii. 554.

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[1] Σινηπι Dioscoridis.

Cl. 15. *Ord.* 2. Tetradynamia Siliquosa. *Nat. ord.* Siliquosæ *Linn.* Cruciferæ *Juss.*

G. 1246. *Cal.* spreading. *Cor.* claws erect. *Gland* between the shorter stamens and pistil, and the longer stamens and calyx.

Species 4. S. *alba.* White mustard. *Smith Flora Brit.* 721.

Species 5. S. *nigra.* Common mustard. *Med. Bot.* t. 151. *Smith Flora Brit.* 722.

1. SINAPIS ALBA.

Officinal. SINAPIS ALBÆ SEMINA. *Edin.* SINAPI; SEMINA. *Dub.* White Mustard-seed.

Syn. Moutarde (*F.*) Senfsamen (*G.*) Senape bianca (*I.*) Grano de Mostaza (*S.*)

This species of mustard is an indigenous annual plant, growing in the fields and by road sides; but also much cultivated; and flowering in June. The root is spindle-shaped, and the stem round, strong, branched, and rising nearly two feet in height. The lower leaves are deeply pinnatifid; the upper ones sublyrate; and the whole rough with strong hairs on both sides, toothed, and of a pale green colour. The flowers are in racemes, with striated peduncles; the leaflets of the calyx are linear, and green; the petals yellow, with the claws narrow, and the border obovate and entire. The pods are spreading, on almost horizontal peduncles, hispid, roundish, ribbed, swelling where the seeds are placed, and furnished with a very long, ensiform, keeled, greenish rough beak. The seeds are large, for the size of the pod, globular, and of a light yellow colour.

2. SINAPIS NIGRA.

Officinal. SINAPIS SEMINA. *Lond.* Mustard-seeds.

Syn. Moutarde noir (*F.*) Schwarzer Senfe (*G.*) Senape (*I.*) Mostaza nigra (*S.*)

Common mustard is an indigenous annual; and although very plentiful in its wild state, yet it is cultivated for domestic and medicinal purposes. It flowers in June. The root is small. The stem, which rises three or four feet in height, is very much branched, and spreading. The leaves are petiolate, variously lobed and toothed; those nearest to the root being rugged, while those of the stem are smooth; and the uppermost narrow, quite entire, and hanging down, which distinguishes it at first sight from its congeners. The flowers are yellow, and small. The calyx is coloured. The pods erect, parallel to the stem, short, quadrangular, frequently smooth, many-seeded, and furnished with a short quadrangular beak. The seeds are small, globular, and of a deep brown colour.

Although the seeds of these two species of mustard differ in their botanical characters, yet they agree in other respects, the common being only rather more pungent; and may be indiscriminately employed. Reduced to a fine powder, they form the common condiment every day used at our tables.

Qualities.—These seeds, in the entire state, are nearly inodorous, but when bruised they have a pungent, penetrating odour. Their taste is bitterish, acrid, and biting. Unbruised mustard seeds, when macerated in boiling water, yield only an insipid mucilage, which, like that of linseed, resides in the skin: but, when bruised, water takes up all their active matter; although it is scarcely imparted to alcohol. In distillation with water, mustard-seeds yield a very acrid volatile oil, on which their virtues are supposed to depend. It is united in the seed with fecula or starch; its force appears to be obtunded by a soft, insipid, fixed oil, which can be separated by pressure, and the cake left after the expression is considerably more pungent and acrid than the unpressed seeds. It is not dissipated by drying, nor by keeping the seeds, and is rendered considerably more active by the addition of vinegar. When the seeds are triturated with lime, and a few drops of water, ammonia is plentifully evolved. Hence their constituents appear to be starch, mucus, a bland fixed oil, an acrid volatile oil, and an ammoniacal salt.

Medical properties and uses.—Mustard-seeds are stimulant, emetic, diuretic, and rubefacient. Swallowed whole, they have been found useful in dyspepsia, chlorosis, and the torpid state of the intestines which accompanies paralysis. The bruised seeds, or the powder, to the extent of a large teaspoonful mixed with water, form an excellent emetic in paralytic, epileptic, and some apoplectic cases, often operating quickly and fully when other emetics fail. In small doses they are found to promote considerably the secretion of urine, and consequently prove beneficial in dropsies. In these affections, however, perhaps the best mode of exhibiting mustard is in the form of whey, which is made by boiling ʒiv. of the bruised seeds in Oj of milk, and straining to separate the curd. A fourth part of this quantity may be taken for a dose three times a day. But mustard is more frequently employed as an external remedy. The flour rubbed on the skin, or applied in the form of a cataplasm, made with crumbs of bread and vinegar, soon excites a sense of pain, considerable inflammation, and sometimes vesication. In these forms it has been found serviceable in paralysis; and applied to the soles of the feet in the delirium of typhus, and in comatóse affections.

Officinal preparations. *Cataplasma Sinapis.* L. D.

SIUM. *Spec. Plant. Willd.* i. 1431.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Umbellatæ.

G. 544. *Fruit* subovate, striated. *Invol.* many-leaved. *Pet.* cordate.

Spec. 4. S. *nodiflorum.* Procumbent Water Parsnip. *Med. Bot. 2d edit.* 139. *Smith Flora Brit.* 313. *Eng. Bot.* 639.

Officinal. SIUM; HERBA. *Dub.* Water Parsnip herb.

Syn. Berle; Ache d'eau (*F.*) Wasser-Partinake (*G.*) Sio; Gorgolestro (*I.*) Sio; Sion (*S.*)

This is an indigenous perennial plant, common in ditches and brooks, flowering in July and August. The root is creeping. The stem procumbent or floating, branched, round, somewhat striated and leafy. The leaves are unequally pinnate, consisting of from 5 to 9 sessile, ovate, serrated leaflets. The umbels are solitary, nearly sessile, and opposite to each leaf. The umbellets are from 5 to 7, divaricated, and composed of twelve flowers. The involucre is of one piece, and often there is none. The involucel is ovate, concave, and the length of the pedicels. The calyx is scarcely visible; and the fruit ovate.

This plant has been omitted by the London College in the last edition of its Pharmacopœia; and we are inclined to believe that its pretensions even to the character of an antiscorbutic require further confirmation.

SMILAX.[1] *Spec. Plant. Willd.* iv. 774.

Cl. 22. *Ord.* 6. Dioecia Hexandria. *Nat. ord.* Sarmentaceæ *Linn.* Asparagi *Juss.*

G. 1800. Male. *Calyx* six-leaved. *Corolla* none.

Female.—*Cal.* 6-leaved. *Cor.* none. *Styles* 3. *Berry* 3-celled. *Seeds* two.

* *Stem prickly, angular.*

Spec. 9. S. *Sarsaparilla.*[2] Sarsaparilla. *Med. Bot. 2d edit.* 161.

Officinal. SARSAPARILLÆ RADIX. *Lond. Dub.* SMILACIS SARSAPARILLÆ RADIX. *Edin.* Sarsaparilla root.

Syn. Racine de Salsepareille (*F.*) Sarsaparille (*G.*) Radiche della Salsapariglia (*I.*) Zarzaparilla (*S.*)

This plant is a perennial, a native of South America and Virginia, flowering in July and August. The root is divided into pedicels, which are somewhat thicker than a goose-quill, straight, externally brown, internally white, and three or four feet in length. The stems are shrubby, long, slender, scandent, and beset with spines: the leaves alternate, ovate, pointed, and petiolate, with long tendrils at the base. The flowers stand three or four together upon a common peduncle. The calyx of the *male* flower is bell-shaped, with the segments oblong, spreading, and reflected at their points; the filaments are six, simple, and bearing oblong anthers: the calyx of the *female* flower is also bell-shaped; the germen ovate, supporting three minute styles, with oblong, reflexed, hairy stigmas; and the fruit a round three-celled berry, containing two globular seeds.

The dried root is imported from the Spanish West Indies, packed in bales. It is in long slender twigs, covered with a wrinkled brown bark, white within, and having a small woody heart.

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[1] Σμιλαξ Dioscoridis.

[2] Bauhin derives the name from *Zarsa*, which, he says, is the Spanish for red; and *parilla*, a little vine. The latter part of the derivation is correct; but we are inclined to think the first part must be referred to *Zarza*, a brier or bush; hence Zarzaparilla would imply *a bushy little vine.*

Qualities. — This root is inodorous, and has a mucilaginous, very slightly bitter taste. It communicates to boiling water, and partially to alcohol and ether, any active matter it possesses. The watery infusion has a brown colour, reddens litmus paper, and yields a precipitate with infusion of galls, which is again dissolved when the infusion is heated. It is precipitated also by lime-water, and solution of nitrate of mercury, and superacetate of lead, but is not affected by sulphate of iron, or any other of the metallic oxides. The alcoholic tincture has a yellowish red hue, is rendered turbid by the addition of water, and yields an extract slightly bitter, and pungent. Ether takes up two parts in ten of the powdered root; and the tincture, which has a golden yellow colour, when evaporated on water, leaves a small portion of reddish yellow insipid resin, and a larger of yellowish extractive dissolved in the water.

Medical properties and uses. — Sarsaparilla is demulcent, and said to be diuretic. It was brought to Europe about the year 1530, and introduced as a medicine of great efficacy in the cure of lues venerea; but fell into disrepute and was little used, till it was again brought into esteem by Dr. William Hunter and Sir Wm. Fordyce, about the middle of the last century; not however as a remedy fitted to cure syphilis, but of much efficacy in rendering a mercurial course more certain, and after the use of mercury.[1] Experience, however, has not verified the encomiums bestowed on it; and the extensive observations of Mr. Pearson have fixed the degree of benefit which is to be expected from this root in syphilitic complaints. "The contagious matter, and the mineral specific, may," he observes, "jointly produce in certain habits of body a new series of [2]symptoms, which, strictly speaking, are not venereal; which cannot be cured by mercury; and which are sometimes more to be dreaded than the simple and natural effects of the venereal virus. Some of the most formidable of these appearances may be removed by sarsaparilla, the venereal virus still remaining in the system; and, when the force of the poison has been completely subdued by mercury, the same vegetable is also capable of freeing the patient from what may be called the sequelæ of a mercurial course."[3] Sarsaparilla is also recommended in scrofula, elephantiasis, or cutaneous affections resembling it, and chronic rheumatism; but its efficacy is doubtful. The dose of the powdered root is from ℈j. to ʒj. given three or four times a day.

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[1] *Medical Observations and Enquiries*, vol. i.

[2] The symptoms alluded to, are nocturnal pains in the limbs, painful enlargements of the knee and elbow joints, membranous nodes, and cutaneous ulcerations, arising after a full course of mercury.

[3] *Pearson on Remedies for Lues Venerea*, 24.

Officinal preparations. *Decoctum Sarsaparillæ.* L. E. D. *Decoctum Sarsaparillæ compositum.* D. *Extractum Sarsaparillæ.* L.

SODÆ MURIAS. *Lond.* MURIAS SODÆ. *Edin.* SAL COMMUNE. *Murias Sodæ.* Dub. Muriate of Soda. Common Salt.

Syn. Muriate de Soude (*F.*) Salzaures Natrum (*G.*) Sal commune (*I.*) Sal (*S.*) Mélh (*Arab.*) Poppoo (*Tam.*) Loon (*H.*)

This salt is one of the most abundant productions of nature, being found in almost every country of every quarter of the globe; either existing in mineral springs[1] or lakes[2]; spread in strata under the surface of the ground[3], or rising from it into mountains[4]; and to its presence also the ocean owes its saltness.[5] In all these situations, however, it is generally mixed with earths and other matters, and therefore must undergo several processes to bring it to the degree of purity in which it occurs as an article of commerce.

In Cheshire, where the greater part of the salt used in this country is made, the brine is pumped up from very deep wells, and evaporated in wrought iron pans, which are generally about twenty or thirty feet long and broad, and nine or twelve inches deep; strongly set upon masonry over a large furnace, from which flues proceed under every part of the pan. They are protected from the weather by light pyramidal roofs of boards, sufficiently open, however, to admit of the escape of the steam from the boiling brine. When the brine attains the temperature of 100° Fahrenheit, it grows turbid, and carbonate of lime and of iron are deposited. These are partly taken off by skimming; but much of the mass falls to the bottom, and cannot be removed until the first deposition of crystallized salt gives it a sufficient body to enable the workmen to rake it out. After this is carefully done, the evaporation is continued at a boiling heat, when the salt gradually forms, and falls to the bottom of the pan in beautifully white delicate crystals, which are fished out, as they collect, with wooden vessels, and poured into large wooden hollow cones, having a hole at the apex, which is undermost. When the salt has sufficiently drained, the cones filled with it are taken to a large room, heated by stoves, where they remain until thoroughly dry.[1] In warm climates the sea water is evaporated in shallow ponds by the heat of the sun; and in this mode what is denominated bay salt is made; but in colder countries the evaporation is carried on by artificial heat in a way similar to the Cheshire process. The crystals of the salt procured by these means are more perfect, and purer, the more slowly the evaporation is conducted.

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[1] The salt spring of Luneburg yields 75,600 gallons of brine in twenty-four hours, of which one-fourth is saline matter, making the annual produce 55,000,000 lbs. of salt. *Kirwan's Geo. Essays*, 392.

[2] These lakes are generally dry in the summer, being formed by the small streams from the hills settling in the valleys, and dissolving the salt of the soil. There is a lake or valley of this description eighteen miles from Aleppo, called in Arabic *Subkhet al Jibool*, or Valley of Salt; in which the salt is found, in the summer, crystallized from half an inch to two inches thick. *Russel's Aleppo*, 2d edit. i. 55.

[3] The stratum of rock-salt in Cheshire is 50 feet thick. The salt mine of Wiliska, near Cracow in Poland, is 6691 feet long, 1115 feet broad, and 743 feet deep. *Coxe's Travels*, i. 197.

[4] Near Cordova in Spain is a mountain of common salt 500 feet high, and nearly three miles in circumference.

[5] The average quantity of salt contained in sea water varies in different latitudes. Between 10° and 20° south, it amounts to rather more than one twenty-fourth; between 18° and 34° north, it is rather less than one twenty-fourth; and at the equator it is nearly one twenty-fifth. *Thomson's Chemistry*, 4th ed. vol. iv. 141.

The common salt of commerce, however, still contains small portions of muriate of magnesia, muriate of lime, and sulphate of lime. To separate these, dissolve the salt in four times its weight of pure water, and drop into the filtered solution, first muriate of barytes, and then carbonate of soda, as long as any precipitate falls. Filter and evaporate the clear fluid slowly till the salt crystallizes, which is pure muriate of soda.[2]

Qualities.— Pure muriate of soda is inodorous; its taste is strictly salt, and when pure, it is perfectly devoid of any degree of bitterness. It is in regular cubes, which are not affected by exposure to the atmosphere. When it deliquesces, it contains muriate of magnesia. Its crystals decrepitate when heated; and in a red heat melt, losing about two per cent. of their weight; and in a still greater heat the salt is volatilized undecomposed in white fumes. Its specific gravity is 2·126. It is equally soluble in cold and in hot water, rather more than two and a half parts of either being required to dissolve one of salt. It consists, according to Berzelius, of 46·55 of acid, and 53·44 of soda in 100 parts.[3] It is decomposed by sulphuric acid and nitric acid.

Medical properties and uses.—This salt is tonic and anthelmintic in moderate doses; purgative in larger; and externally stimulant. In the ordinary mode of using it, the tonic power of salt operates in assisting the process of digestion; and consequently, taken more freely, it proves useful in dyspepsia, and in correcting the weakened state of intestines, which favours the propagation of worms. In large doses it is said to check vomiting of blood, and may be used as a purgative; although it is seldom employed.[4] As a local stimulant, its solution in tepid water, in the proportion of ℥ſs or ℥j to Oj of water, forms the common domestic enema. It is used also as a fomentation to sprains and bruises; and, dissolved in a large proportion of water, forms the best stimulant general bath, whether used cold, or in a tepid, or in a hot state. To answer the first intentions, the dose of muriate of soda may be from grs. x. to ʒj; but to operate by stool from ℥ſs to ℥j is necessary. It should be largely diluted.

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[1] *Aikin's Dictionary of Chemistry.* [2] *Thomson's Chemistry*, 4th ed. ii. 377.

[3] Other chemists have obtained different results. Berard procured from 100 parts of acid 43·57. Dr. Marcet 46·54.

[4] The purgative property of sea water does not altogether depend on this salt, as it contains a large proportion of muriate of magnesia, which is purgative.

Officinal preparation. *Murias Sodæ siccatum.* E. D.

SO'DÆ SUB-BO'RAS. *Lond.* BORAS SODÆ. *Edin.* BORAX. *Sub-boras Sodæ.* Dub. Subborate of Soda.[1]

Syn. Borate alcalinule de Soude (*F.*) Borax (*G.*) Borace (*I.*) Borrax (*S.*) Boorne (*Arab.*) Tancána (*San.*) Sohaga (*H.*)

This is the purified state of a natural salt found in Persia and Thibet. In the latter country it is formed in the bed of a lake situated among the mountains, fifteen days' journey from Tisoolumba, which is twenty miles in circumference, and supplied only by springs from the bottom.[2] The borax is dug in large masses from the edges and shallows of the lake; yet the quantity is not diminished, the cavities being gradually filled by a fresh deposition of the salt. In this state it is named *tincal*, and is brought home packed in chests, in masses of adhering crystals, of a grey yellowish, or greenish white colour, intermixed with sand and other impurities, and covered with a greasy artificial production to prevent it from efflorescing. The purification of tincal was first discovered by the Venetians; and afterwards long carried on by the Dutch, who kept the process secret. It is now practised in England; and although the method has not yet been made public, yet Pelletier has ascertained, that by destroying the unctuous matter by calcination, the salt may be obtained pure by solution and crystallization.[3]

Qualities. — Purified sub-borate of soda is inodorous, and has a styptic, cool, alkalescent taste. It is of a white colour, and usually in irregular crystalline masses, approaching to the form of hexangular prisms, terminated by triangular pyramids. It effloresces slowly and very slightly in the air; dissolves in twelve times its weight of water at 60° of Fah., and in six times its weight of boiling water, the solution changing the vegetable blues to green. In a moderate heat it undergoes the watery infusion, loses four-tenths of its weight, and becomes a dry, white, spongy mass, without undergoing any decomposition. According to Bergman, 100 parts consist of 34 acid, 17 soda, and 49 water; the acid, however, is not sufficient to saturate the alkali, and consequently the salt is a sub-borate. It is decomposed by the majority of the acids; by potash, and the sulphates, muriates, phosphates, and fluates of the earths, and of ammonia.

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[1] The term *borax* is a corruption of the Arabic word *buruk*, which signifies *brilliant.* Vide Asiatic Researches, 8vo. vol. iii. p. 255.

[2] Saunders, *Phil. Trans.* vol. lxxix. 97.

[3] *Mémoires de Chimie*, vol. i. 82.

Medical properties and uses. — This salt is refrigerant and detergent. It is not given internally; and its chief employment is in aphthous affections of the mouth, and excessive salivation. It is applied either in the form of powder mixed with sugar, or dissolved in water, and united with honey as a lotion.

Officinal preparation. *Mel Boracis.* L. E.

SO′DÆ SUL′PHAS. *Lond. Edin.* Sulphate of Soda.

Syn. Sulphate de Soude (*F.*) Krystallisirtes Schwefelsaures Natrum, Glaubersalz (*G.*) Sale Mirabile di Glaubero (*I.*) C'hara Nún (*H.*)

This salt is found native in combination with oxide of iron, and muriate and carbonate of soda, sometimes effloresced on the surface of the soil in the neighbourhood of salt lakes, as in Hungary; and very often forming part of the contents of mineral saline springs, as those of Cheltenham and of Carlsbad. But the greater part of it used in this country is artificially prepared, and chiefly in the large way, during the manufacture of sal ammoniac from sulphate of ammonia and common salt. On this account the London College has inserted it in the list of materia medica; but as a formula is also given for its preparation, we shall defer the consideration of its qualities and uses till it comes under our notice among the Preparations.

SO′DA IMPU′RA. *Carbonas Sodæ impura.* Lond. SUBCARBONAS SODÆ IMPURUS. *Barilla.* Edin. BARILLA. *Soda impura.* Dub. Impure Soda. Carbonate of Soda. Barilla.[1]

Syn. Soude (*F.*) Kohlensaures Natrum (*G.*) Soda (*I.*) Barilla (*S.*) Sejji-mitti (*H.*) Sorjica (*San.*)

Carbonate of soda is found native in Hungary, Syria, Egypt, and India, on the surface of the earth, and on the margins of some lakes which become dry in summer. A large quantity is annually collected from the natron lakes of Egypt, situated in the valley Bahr-bela-ma, near the Delta. It is named *trona* by the natives; but very little of it finds its way to Europe: and the greater part of that which is employed, in this country at least, is of vegetable origin, being prepared from the ashes of some species of *Algæ;* but more abundantly from those of the Salsola soda, a plant which is cultivated on the shores of the Mediterranean by the Spaniards expressly for the purpose of yielding this salt. This plant is cultivated in salt marshes, chiefly in the vicinity of Alicant; and near Carthagena two hundred thousand quintals of barilla are gathered annually.

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[1] Νιτρον of the ancients. It is remarkable that both the London and Dublin Colleges have fallen into the same error in naming this salt *impure soda;* the composition of the salt being well ascertained.

In September, when the seed is ripe, it is pulled up by the roots: after which it is dried, and in October is burnt in simple furnaces, the heat of which is just sufficient to cause the ashes to enter into a state of semifusion, and concrete into compact cellular masses, which form the *barilla* of commerce. That which is obtained in this country by burning the sea-wrack (chiefly the Fucus *vesiculosus* and *serratus*) is denominated *kelp*; and is the worst description of this salt.[1] Sardinia also furnishes some barilla, but inferior in quality to the Spanish. In Sicily barilla is procured at *Catania*, *Trapani*, *Marsala*, *Terranora*, and *Girgenti*. Orkney furnishes annually about three thousand tons of kelp.[2]

Vauquelin has proved that the salt exists ready formed in Salsola soda, and is only set free by the burning of the plant.[3] He obtained from 500 parts of the plant 100 parts of ashes, besides oil, ammonia, and prussic acid. Five hundred grains of the ashes afforded 113 of muriate of soda, 68 dry subcarbonate of soda, 204 insoluble subcarbonate of magnesia, 100 of sand and oxide of iron, and 23 of water[4]; an analysis which may be regarded as exhibiting the general components of barilla.

There are several varieties of barilla brought from Spain; that which is known by the name of *sweet barilla* is the most esteemed.

Qualities. — Good barilla is in hard, dry, spongy, sonorous masses of a greyish blue colour, and becoming covered over with a saline efflorescence when exposed to the air. It should not emit any unpleasant odour on solution; and when applied to the tongue should impress a sharp alkaline taste.

Use. — Impure subcarbonate of soda is employed only for yielding the pure subcarbonate.[5]

Officinal preparation. *Sodæ Subcarbonas.* L. E. D.

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[1] The inhabitants of the Canary Isles extract carbonate of soda from the ashes of the Mesembryanthemum *crystallinum*, or ice plant, which yield one-third of their weight of the salt. *Phil. Mag.* vi. 187.

[2] The sea-wrack is cut from the rocks in April and May chiefly, dried in the air, and then burnt in a kiln, in which they are stirred with an iron rake into a fluid state; on cooling, the ashes condense into a dark blue or whitish mass, very hard and solid. The plants about three years old, yield the largest quantity of kelp. The best kelp has an acrid, caustic taste, a sulphurous odour; is compact, and of a dark blue greenish colour. It yields about one-twentieth part of its weight of soda.

[3] *Annales de Chimie*, xiii. 65.

[4] *Annales de Chimie*, xviii. 76.

[5] A tolerably pure subcarbonate of soda is obtained in France from sea salt, and muriate of soda. To a solution of one part of salt, three parts of finely pulverized litharge is added, and rather more than half a part of chalk. These are agitated well together, and then set apart; a double decomposition gradually takes place, muriate of lead and muriate of lime are formed, while the soda, uniting with the carbonic acid set free from the chalk, crystallizes, and is easily separated.

In Britain it is obtained in considerable quantity by decomposing sulphate of soda, either by means of subcarbonate of potash, or acetate of lime, or litharge; or by de-

SOLANUM. *Spec. Plant. Willd.* i. 1025.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Luridæ *Linn.* Solaneæ *Juss.*

G. 383. *Corolla* wheel-shaped. *Anthers* slightly coalescing, opening by two pores at the apex. *Berry* two-celled.

* *unarmed.*

Species 15. S. *Dulcamara.* Woody Nightshade, or Bitter-Sweet. *Med. Bot.* 2d *ed.* 240. *t.* 85. *Smith Flora Brit.* 256. *Eng. Bot.* 565.

Officinal. DULCAMARÆ CAULES. *Lond.* SOLANI DULCAMARÆ CAULES. *Edin.* DULCAMARA; STIPITES AUTUMNO COLLECTI. *Dub.* The Stalks of Bitter-Sweet.

Syn. Douce-amere (*F.*) Bittersusstangel (*G.*) Dulcamara (*I.*)

This species of Solanum is an indigenous shrub, growing in hedges and shaded spots; and flowering in June and July. The root is ligneous: the stem woody, roundish, branched, and climbing sometimes to the height of six or eight feet: the leaves are alternate, on footstalks, entire, smooth, soft, about two inches long and one broad, and of a dull green colour; the lowermost cordate and undivided, and the uppermost halberd-shaped: the flowers are in elegant clusters opposite to the leaves, or terminal, drooping, and having the semblance, but not the structure, of a true cyme; each consisting of a small purplish calyx with blunt segments: a corolla of five reflected, equally divided, pointed, bright violet-coloured segments, with two green dots at the base, and a longitudinal deeper purple vein through the centre of each segment; and large, erect, almost sessile, lemon-yellow anthers: the berries, which ripen in September and October, are oval, scarlet, very juicy, bitter, and poisonous.[1]

The extreme twigs are the parts employed. They should be gathered in autumn, as at that season they are more powerful; depending perhaps on their being less succulent, and containing more of the peculiar secretion on which the virtues of the plant depend.

Qualities.—Both the fresh and dried twigs are inodorous. They have a slightly bitter taste, followed by a sweetness not unlike that of liquorice root, with a slight degree of acrimony. Boiling water extracts all their active matter; but their virtues are destroyed by much coction. Scheele found that they contain citric acid.

Medical properties and uses.—Bitter-sweet is diuretic and

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composing the sulphuric acid of the sulphate by charcoal. The latter method is practised in the West of Scotland, and affords a very pure subcarbonate of soda. "About 500 cwt. of sulphate of soda and 100 cwt. of charcoal are ground together, and the mixture exposed in a reverberatory furnace until it becomes pasty. It is then transferred into large casks, and lixiviated. The ley is afterwards evaporated and crystallized." *Duncan's New Edinburgh Dispensatory*, 216.

[1] They excite violent vomiting and purging.

narcotic. It has been found useful in humoral asthma, dropsy, chronic rheumatism, and in lepra vulgaris and alphos, scabies, and ptyriasis. Willan[1] remarks, that it is not applicable for the cure of lepra nigricans: we can assert that it is not of the least use in acute rheumatism; and we believe of as little in fluor albus and suppression of the menses, in which it has been strongly recommended. When given in too large doses at first, it occasions nausea, vomiting, syncope, and violent palpitation. It therefore requires to be begun with small doses; and even when it is more cautiously administered, if these symptoms occur, the dose must be lessened, and some aromatic conjoined. The usual form under which it is used is that of watery infusion or decoction; but it may be also given in substance pulverized. The dose of the powder may be from grs. x. to ʒj taken in a cupful of milk.

Officinal preparation. *Decoctum Dulcamaræ.* L.

SOLIDAGO. *Spec. Plant. Willd.* iii. 2053.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Discoideæ *Linn.* Corymbiferæ *Juss.*

G. 1292. *Receptacle* naked. *Pappus* simple. *Corollets* of the ray about five. *Calyx* scales imbricate, closed.

***** with erect racemes.*

Species 35. S. *Virgaurea.* Common Golden Rod. *Smith Flora Brit.* iii. 890. *Eng. Bot. t.* 301.

Officinal. VIRGA AUREA; FLORES, FOLIA. *Dub.* Flowers and leaves of Common Golden Rod.

This is an indigenous perennial plant, found in woods, copses, and among furze upon heathy ground; flowering from July to September. The leaf consists of long simple fibres: the stem, which varies in height, from ten inches to three feet, is curved below, then erect, leafy, very slightly zigzag, angular, striated, rough, and a little downy: the leaves are deep green on the upper surface, and pale beneath, on winged petioles, harsh, and clothed with rigid down: the radical leaves are obovate and serrated; the stem leaves narrower, more entire, and alternate: the flowers are yellow, in terminal and axillary erect clusters, forming a dense panicle, with lanceolate, downy bractes: the scales of the calyx are membranous, with a downy border: the rays of the corolla from five to nine or ten, oblong, elliptical, and toothed at the apex: the seeds are pubescent, and the pappus rough.

Qualities.—The odour is slightly aromatic, and the taste subastringent and somewhat aromatic. Boiling water extracts the active matter of the leaves: the infusion changes slightly to green syrup of violets, and precipitates sulphate of iron black.

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[1] *Description and Treatment of Cutaneous Diseases,* 147.

Medical properties and uses. — Golden rod is astringent, and has been regarded as lithontriptic. It may be of some use in a weak state of the viscera; and hence, like other tonics, may prove beneficial in calculous habits; but its effects are not sufficient to entitle it to much notice. The dose of the powdered leaves and flowers may be from grs. x. to ʒj or more.

SPARTIUM.[1] *Spec. Plant. Willd.* iii. 926.

Cl. 17. *Ord.* 4. Diadelphia Decandria. *Nat. ord.* Papilionaceæ.

G. 1332. *Stigma* longitudinal, villous above. *Filaments* adhering to the germen. *Calyx* produced downwards.

* * *with ternate leaves.*

Species S. *scoparium.* Common Broom. *Med. Bot. 2d ed.* 413. *t.* 150. *Smith Flora Brit.* iii. 753.

Officinal. SPARTII CACUMINA. *Lond.* SPARTII SCOPARII SUMMITATES. *Edin.* GENISTA; SEMINA; CACUMINA. *Dub.* The tops and seed of Broom.

†*Syn.* Genet à balais (*F.*) Pfriemenkraut (*G.*) Ginestra (*I.*) Esparto (*S.*)

This is an indigenous shrub, growing on dry common pastures; flowering in May and June. It usually rises from four to six feet in height, and sends off numerous straight, angled, green, smooth, leafy branches: the leaves are ternate, small, and smooth; the upper ones, however, are frequently simple: the flowers are papilionaceous, axillary, solitary, peduncled, nodding, large, and showy; of a golden colour, sometimes tawny on the outside, and occasionally altogether of a lemon hue: the calyx is nearly bell-shaped, bilabiate, gaping, even, and purplish, with a five-toothed lip: the stamens are all united into a tube at the base, and bear oblong saffron-coloured anthers: the germen is villous: the style bent almost to a circle: and the legume compressed, brown, ciliated; and containing several compressed shining seeds.

Qualities. — The tops, when bruised, have a disagreeable odour, and a nauseous bitter taste. Both water and alcohol extract their active matter.

Medical properties and uses. — Broom tops are diuretic and cathartic; the seeds are said to be emetic. The effects of this plant have been very long known to the common people; and both Mead and Cullen found them useful in dropsy. The usual mode of exhibiting them is in the form of decoction, made by boiling ℥j of the green tops in a pint of water down to half a pint. Speaking of this decoction, of which two table spoonfuls were given every hour till it operated by stool, Cullen says[2]: "It seldom fails to operate both by stool and urine, and by repeated exhibition every day, or every second day, some dropsies have been cured[1]:" Sydenham used the ashes, which contain an alkaline salt.[2]

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[1] Σπαρτιον Dioscoridis.

[2] *Mat. Med.* ii. 534.

Officinal preparation. *Extractum Cacuminum Genestæ.* D.

SPIGELIA. *Spec. Plant. Willd.* i. 824.[3]

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Stellatæ *Linn.* Gentianæ *Juss.*

G. 308. *Corolla* funnel-shaped. *Capsules* twin, two-celled, many-seeded.

Species 2. S. *marilandica.* Perennial Worm-grass. *Med. Bot. 2d ed.* 178. *t.* 69. *Edin. Phil. Trans.* iii. 151. *t.* 1.

Officinal. SPIGELIÆ RADIX. *Lond. Dub. Edin.* Worm-grass root.

Syn. Spigelie de Maryland (*F.*) Spigelia (*I.*)

This is a perennial plant, a native of the warmer parts of North America; flowering in July and August.[4] The stems are annual, simple, erect, rough, quadrangular, and rigid; and about seven or eight inches in height: the leaves are opposite, sessile, ovate-lanceolate, quite entire, smooth, and spreading: the flowers are in a solitary spike, with small opposite bractes: the calyx consists of five awl-shaped, persistent leaflets: the corolla is of a bright red colour on the outside, and deep orange within, pentangular above, gibbous at the throat, widening at the base; with the border five parted; the segments being lanceolate and revolute: the stamens are five, shorter than the corolla, supporting sagitate, converging anthers: the germen is superior, with a round style, jointed below, with the upper part deciduous: the seeds are angular and rugged.

Qualities.— Spigelia root has a bitter taste, which is imparted to boiling water.

Medical properties and uses.— This root is purgative and anthelmintic. Its anthelmintic virtues were discovered by the Cherokee Indians, to whom it is known under the name of *unsteetla*; and many opportunities of proving its efficacy in worm cases have occurred both in America and this country. When in the recent state, and given in small doses, it occasionally produces giddiness, dimness of sight, and even convulsions; effects which are attributed to a narcotic principle it possesses, but which its powerful cathartic property prevents from acting, when the dose is large. It is usual to administer an emetic previous to the use of it; and to aid its purgative operation by the addition of two or three grains of calomel, or eight or ten of rhubarb. It has been found most powerful in expelling lumbrici; and its vinous infusion is said to have been found useful in intermittents. Dr. Barton recommends it in the protracted remitting fever of infants, which often lays the foundation of hydrocephalus. Spigelia root may be administered either in substance or in the form of aqueous infusion. The dose of the pulverized root is from grs. x. to ʒj, given every night and morning until the worms are expelled.

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[1] *Materia Medica,* ii. 534.

[2] *Tract. de Hydrope,* Opera, 466.

[3] The genus was named after Adrian Spigelius, a celebrated professor of anatomy at Padua.

[4] It was first cultivated in England in 1694, by Bobart.

SPIRITUS RECTIFICATUS. *Lond.* ALCOHOL FORTIUS. *Edin.* SPIRITUS VINOSUS RECTIFICATUS. *Dub.* Rectified Spirit. Alcohol.

Syn. Eau de Vie Rectifiè (*F.*) Rectifizirter Weingeist (*G.*) Acquavite rettificata (*I.*) Agua ardiente (*S.*)

This is alcohol nearly in the highest state of concentration in which it can be easily prepared in the large way for the purposes of trade. The London and Edinburgh Colleges state its specific gravity to be to that of water as 835 to 1000; while the Dublin College states it at 840. The Edinburgh College names this spirit *alcohol*; but as directions are given both by the London and the Dublin Colleges for the preparation of a still stronger spirit, the name of *alcohol*, in their pharmacopœias, is judiciously retained for the stronger spirit, while that of *rectified spirit* is applied to the present preparation.

All substances which have undergone the vinous fermentation, and in which it is not completely over, contain alcohol ready formed, but combined with colouring matter, extractive, and other principles, and are capable of affording it by distillation. The first distillation of wines and fermented liquors afford ardent spirits, such as brandy, rum, arrack, whisky and gin.[1] These are all mixtures of alcohol, water, and a little oil or resin, which give them their characteristic flavour and colour, and the quantity and nature of which constitute the sole differences in ardent spirits. It is from the re-distillation or rectification of these that rectified spirit is produced.

The process of rectification is exceedingly simple. Any quantity of brandy, malt spirits, or rum, is diluted with an equal portion of water, and put into an alembic or still, to which a refrigeratory is united, and distilled with a very gentle heat. The first product is the strongest and purest, and, when it has come over to the amount of one-fourth of the whole contents of the still, forms the rectified spirit. If the distillation be continued, the spirit continues to come over colourless, but weaker and weaker, till at length it is so watery as not to be inflammable. What remains in the alembic is water, the colouring ingredients, and any accidental impurities. When the ardent spirits, which have been employed, contained much oil, the distillation requires to be repeated, and generally with the addition of alkali, lime, or other articles, before the empyreumatic flavour can be completely destroyed. When alkali is used, the spirit has an urinous taste; to free it from which it is again distilled with the addition of a little alum and charcoal, the acid of the former of which attracts the small portion of alkali which the spirit held in solution. Malt spirits, when properly rectified, yield as pure and as strong rectified spirit as brandy.

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[1] We have no historical record of the period when the distillation of spirit was invented: the Greeks and Romans were ignorant of ardent spirits; but it it certain that spirits were very early known to the northern nations.

The strength of spirits is ascertained in common by several methods. The taste, and the degree of frothiness or size of the bubbles formed when spirit is shaken, is the least correct method; and the burning the spirit, and observing the quantity of water which remains after the combustion, although more accurate, is liable also to error, from the impossibility of performing the experiment always under the same circumstances. Pure alcohol [1] leaves no water; rectified spirit of moderate strength, 25 per cent.; French brandy, 56; and common malt liquor, 65; and the like. Another test is the pouring a few drops of the spirit on gunpowder; but this is also very incorrect, and indicates two degrees of strength only; that which fires gunpowder, and that which cannot fire it. A more accurate test than any of these, and sufficient for common purposes, is to shake the spirit in a phial with very dry pure sub-carbonate of potash, and observe the quantity of water attracted by the alkali, which indicates its strength. But the only certain mode of ascertaining the relative strength of spirits is by determining the specific gravity of the spirit, at a given temperature. Thus at 60° Fahrenheit the specific gravity of rectified spirit is ·83599, at 65° it is ·83362, and at 70° the gravity of the same spirit is ·83124; while the gravity of the proof spirit of the London College at the same degrees of temperature is ·93002, ·92794, and ·92580; (see Table under the article *Alcohol* among the Preparations;) the weakest spirit having the greatest specific gravity, and this diminishing as the temperature increases. The usual mode of ascertaining the relative gravity of different spirits is by the hydrometer[2], of which there are different kinds in use. For ordinary purposes, the relative strength of spirits may be known by weighing the sample to be tried in a phial capable of holding exactly 500 grains of distilled water. An equal bulk of rectified spirit weighs 418 grains, and of proof spirit 465; hence the number of grains above or below these sums will indicate the relative strength of the spirit.

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[1] By the term *pure alcohol* is meant alcohol of a specific gravity of 796 at 60° Fahrenheit, the strongest which can be procured.

[2] For a description of this instrument see Part I.

Qualities. — Pure rectified spirit has a fragrant odour, and a hot, highly pungent taste. It is colourless; always fluid; cannot be congealed at any known degree of cold; evaporates speedily at the ordinary temperature of the atmosphere; boils at 163° Fahrenheit; and is extremely inflammable, burning with a blue lambent flame, without any sensible smoke. Like alcohol it combines with water in every proportion; and, on account of its affinity for water, precipitates many of the neutral salts from their aqueous solutions. It is capable of dissolving many saline bodies, and is the proper solvent of the greater number of the proximate principles of vegetables. Its constituents are 85 of pure alcohol and 15 of water, in 100 parts, when its specific gravity is 835 at a temperature of 60° of Fahrenheit; but 83 only of pure alcohol, and 17 of water, when it is 840 as designated by the Dublin College.

Medical properties and uses. — Rectified spirit is a very powerful stimulant. In its undiluted state it is never exhibited as a remedy; and is employed only for forming the diluted spirit, and as a pharmaceutical agent.

Officinal preparations. *Alcohol.* L. D. *Spiritus Camphoræ.* L. E. *Spiritus Ammoniæ.* L. D. *Spiritus Lavandulæ.* L. E. D. *Tinctura Aloes.* L. *Tinctura Asafœtidæ.* L. E. D. *Tinctura Benzoini composita.* L. E. D. *Tinctura Castorei.* L. E. D. *Tinctura Guaiaci.* L. E. D. *Tinctura Moschi.* D. *Tinctura Ferri Muriatis.* L. *Tinctura Muriatis Ferri cum Oxydo rubro.* D. *Liquor Hydrargyri Oxymuriatis.* L.

SPIRITUS TENUIOR. *Lond.* ALCOHOL DILUTIUS. *Edin.* SPIRITUS VINOSUS TENUIOR. *Dub.* Weaker Spirit. Diluted Alcohol. Proof Spirit.

This is merely rectified spirit diluted with a certain proportion of water. According to the London and Dublin Colleges, its specific gravity should be to that of distilled water as 930 to 1000; while the Edinburgh College orders it of the gravity of 935. The former may be formed by mixing four parts by measure of rectified spirit with three of water, and contains 44 parts of pure alcohol and 56 of water in 100 parts; the latter is obtained from equal parts of rectified spirit and water, and contains 42 of pure alcohol and 58 of water in 100 parts. But very frequently, instead of being formed by mixing the pure rectified spirit with water, an impure spirit of a strength nearly similar is employed. The qualities of the diluted spirit are not different from those of the rectified spirit, except in degree, and in some instances it is better fitted for taking up the principles of vegetables submitted to its action.

Medical properties and uses. — Alcohol diluted to the degree of proof spirit is still a very powerful diffusible stimulant, and too strong for internal use. Externally applied, it is recommended in burns; to restrain bleeding in passive hæmorrhagies; and as a friction or fomentation to relieve muscular pains; and in a more diluted state it forms a good collyrium in the latter stage of ophthalmia. Proof spirit diluted with water is employed as a remedy in the form of tinctures and spirits; and the ardent spirits in common use may be regarded as nearly of the same nature. These taken in moderation increase the general excitement, communicate additional energy to the muscular fibres, strengthen the stomach, and exhilarate the mind. Hence they are often and advantageously used in cases of debility and the low stage of typhoid fevers, in which the use of wine is indicated; and in habits disposed to create acidity they are even preferable to wine; some of them, particularly brandy, proving gratefully stomachic, when wine is nauseated and rejected. As an article, however, of daily or dietetical use, particularly if taken in immoderate doses or long continued, ardent spirits, besides being the source of much moral evil, and debasing the human character nearly to a level with that of brutes, occasion disease, and are commonly the origin of dyspepsia, hypochondriasis, and hepatic and visceral obstructions. The hurtful effects of ardent spirits, however, are obviated in a considerable degree, by diluting them with water, and adding lemon-juice and sugar to the mixture, so as to form what is generally known by the name of punch. Although all the varieties of ardent spirits may be regarded as diluted alcohol, yet each has a peculiarity of operation: thus *brandy* is simply cordial and stomachic; *rum* heating and sudorific; *gin* and *whisky* diuretic; and *arrack* styptic, heating, and narcotic, and ill adapted to European constitutions.

Officinal preparations. *All the tinctures except those which are prepared with rectified spirit; and all the spirits.*

SPONGIA. *Syst. Nat. Gmelin.* vi. 3817.

Cl. 6. *Ord.* 4. Vermes Zoophyta.

G. 343. A flexile, fixed, torpid, polymorphous *animal*, composed either of reticulate fibres, or masses of small spires interwoven together, and clothed with a gelatinous flesh full of small mouths on its surface, by which it absorbs and ejects water.

Sp. 8. S. *officinalis*. Officinal Sponge. *Phil. Trans.* lv. 288. *t.* 10.
Officinal. SPONGIA. *Lond. Dub.* SPONGIA OFFICINALIS. *Edin.* Sponge.

Syn. Eponge (*F.*) Meerschwamm (*G.*) Spagna (*I.*) Esponja (S.) Isfunge (*Arab.*) Mo-ābādul (*H.*)

This species of sponge is found chiefly in the Mediterranean and Red Seas. In some of the islands of the Archipelago, the inhabitants are trained from infancy to dive for sponges, which are generally found attached to the bottom of the rocks. Although the ancients had perceived something like sensation in sponges by their shrinking, they were long supposed to be of a vegetable nature, from their texture and the branched appearance which they assume, till Mr. Ellis's observations[1] first established the fact that they are animals sui generis, the mouths of which are the open ends of so many branched tubes opening on the surface, through which they receive their nourishment and discharge their fæces like polypes. These mouths are generally guarded with minute spines or points, and the tubes are filled with a gelatinous matter, and often with minute shells and sand.

Qualities — Sponge cleaned and rendered fit for use is of a brownish yellow colour, soft, light, and very porous; absorbing rapidly by capillary attraction as much as it can contain of any fluid in which it is immersed, and again yielding it up on being compressed. When sponge is digested with boiling distilled water it yields up to it a considerable proportion of gelatin, and the sponge loses much of its flexibility, and crumbles between the fingers when dry. Boiled with potash it forms a soap. Its principal constituents, according to the analysis of Mr. Hatchett, are animal gelatin, albumen, a small portion of common salt, and some carbonate of lime.

Medical properties and uses. — Sponge, in its usual form, is never employed as a remedy; but is an exceedingly useful instrument in the practice of surgery.

Officinal preparations. *Spongia usta.* L. D.

STALAGMITIS. *Spec. Plant. Willd.* iv. 980.

Cl. 23. *Ord.* 1. Polygamia Monoecia. *Nat. ord.* Tricoccæ.

G. 1888. *Hermaph. Calyx* four-leaved. *Corolla* four-petalled. *Stamens* thirty, inserted into a fleshy four-angled receptacle. *Style* thick. *Stigma* four-lobed. *Berry* one-celled, crowned by the style, three-seeded.

Male. Calyx, Corolla, and *Stamens* hermaphrodite.

Sp. 1. S. *Cambogioides.* The Gamboge-tree. *Murray App. Med.* iv. 655.

Officinal. CAMBOGIA. *Lond.* GAMBOGIA. *Edin.* GAMBOGIA; GUMMI RESINA. *Dub.* Gamboge.

Syn. Gomme Gutte (*F.*) Gummigutt (*G.*) Gomma Gotta (*I.*) Ossāra réwūnd (*Arab.*) Gahketu (Cingalese.)

The tree yielding this gum-resin is a native of the kingdom of Siam, and of Ceylon, where it is known by the names *Ghokata*, or *Gohkata*, or *Gohlatha*. It is of middling stature, and moderately branching. The leaves are on short petioles, ovate, opposite, entire, even, coriaceous, rigid, and of an obscure green colour. The *male* flowers are either in distinct clusters, or mixed with the hermaphrodite, which are axillary. The calyx consists of four ovate leaflets, the two exterior of which are smaller than the two interior: the petals are four, spreading, coriaceous, with ciliated margins, and of a yellow colour: the stamens are about thirty, affixed to a quadrangular fleshy receptacle, and bearing subquadrangular, club-shaped anthers; sometimes there is the rudiment of a style, and an echinated, unequal, sterile stigma. The *hermaphrodite* flowers are in axillary whorls, or on the joints of the smaller branches, sometimes mixed with the male flowers, sometimes in opposite gems. The calyx, corolla, aud stamens are the same in both: the germen is globular, with a short solitary style, and a three or four-lobed stigma; with the lobes spreading, obcordate, and persistent. The fruit is a smooth globular whitish or rosaceous berry, crowned by the lobes and style of the stigma, and containing several long, triangular seeds.

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[1] *Phil. Trans.* lv. 284.

In Siam the gamboge is obtained in drops by breaking the leaves and young shoots, but in Ceylon from the bark of the tree wounded with a sharp stone. It is collected first in cocoa-nut shells, and thence transferred into large earthen jars, where it remains until it is nearly dried to a cake, when it is formed into rolls and wrapped up in leaves.[1] It is brought to Europe packed in cases and boxes. It was first brought to Europe by the Dutch, about the middle of the seventeenth century.

Qualities. — Gamboge is inodorous, and nearly insipid; opaque, brittle, breaks with a vitreous fracture, and is of an orange-yellow colour. Its gravity is 1·221.[2] When heated it melts, and by increasing the heat burns with a white flame, and leaves a very light spongy charcoal. When wetted, it stains the fingers a brilliant yellow; and when triturated with water about two-thirds are dissolved, and a turbid yellow solution produced. Alcohol dissolves nine parts in ten, sulphuric ether six parts; and both form transparent deep golden yellow tinctures. Gamboge is also soluble in a strong solution of pure ammonia, and potash, forming deep orange-red solutions.

The watery solution of gamboge reddens tincture of litmus; is not precipitated by alcohol, but, on the contrary, is rendered transparent by it; oxysulphate of iron strikes with it a pale olive-brown hue, but is not precipitated, nor is it affected by solutions of any of the other metallic salts. The alcoholic tincture is rendered turbid and bright yellow by the addition of water, but the precipitate is long of being deposited. The ethereal tincture, when evaporated on water, leaves a pellicle of beautiful orange-coloured brittle resin, which imparts no colour to water. When water is added to the alkaline solutions they are not even rendered turbid; but, on the addition of acids, yellow precipitates are produced which are soluble in an excess of acid. These experiments confirm the analysis of Braconnet, from which he concluded that gamboge contains one part of a gum resembling cherry-tree gum, and four of a brittle resin; but they do not throw any light on the nature of its cathartic property.

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[1] The Cambogia *gutta* of Linnæus, several species of Hypericum, Chelidonium *laciniatum*, and several other plants, yield a yellow juice; but that the tree we have described affords the true gamboge, was clearly established by Kœnig, who resided many years at Tranquebar.

[2] Brisson.

Medical properties and uses. — Gamboge is a powerful drastic cathartic; and frequently excites vomiting, even in moderate doses. It is efficaciously used in obstinate costiveness, in dropsies, and for the expulsion of tæniæ; but, from the violence of its operation, and the griping it occasions, it requires to be exhibited with caution. As a hydragogue it is usually combined with squill and supertartrate of potash; and for cathartic purposes, with calomel, soap, or rhubarb. The alkaline solution of it has also been administered in dropsy, in which form it is said to operate both by stool and urine.

The dose of the alkaline solution is from ♏ xxx ♏l in a cupful of water twice a day. It is, however, more usually given in substance, in the form of pills, in doses of from grs. ij. to grs. vj, variously combined.

Officinal preparations. *Pilulæ Cambogiæ compositæ.* L. E.

STANNUM.[1] PLUMBUM ALBUM. Κασσιτερον. Tin.

Syn. Estain (*F.*) Zinn (*G.*) Stagno (*I.*) Estano (*S.*) Resass (*Arab.*) Ranga (*H.*) Tágárum (*Tam.*)

This metal is not very diffusely spread over the surface of the globe; but is very abundant in the places where it occurs. It is plentifully procured in Cornwall[2]; and mines of it are also wrought in the Erzgebirje, on the borders of Bohemia; in the province of Gallicia, in Spain; and in the peninsula of Malacca, in Asia. It is said also to have been found in Chili.

It occurs

A. In its metallic state:

I. United with Sulphur and copper. Sp. 1. *Tin pyrites.*

B. Oxidized:

II. Combined with oxide of iron and silex. 2. *Tin stone.*

3. *Wood tin.*

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[1] Beckman is of opinion that the *Stannum* of the ancients was neither our tin nor a peculiar metal; but the regulus of lead, or *werk* of the Germans, as procured by the first smelting of the ore, which always contains silver. *Hist. of Inventions,* vol. iv. p. 7.

[2] It is uncertain when the Cornwall mines were first wrought. The Phœnicians came to Britain for tin; and there is a tradition in Cornwall, that the very old forsaken works were those of the Jews, and are therefore called *Attal sarazim.* The Jews' cast off works. *Norden's Description of Cornwall,* 4to. 1728, 41.

The purest and best tin of Cornwall is procured from the tin stone, which is found beneath the beds of streams, particularly at Carn near Perran. The ore is found under a stratum of clay about fifty feet thick, and a layer of rounded stones; occurring loose in lumps and grains of various sizes. It is first washed, then bruised and passed through wire sieves containing 16 meshes in the square inch; and next smelted with charcoal, in a common blast furnace, through a hole in the bottom of which the reduced metallic tin flows into a pit below; to purify it, the tin in the fused state is ladled from the pit into an iron boiler placed over a fire; and pieces of charcoal plunged, by means of an iron instrument, to its bottom, which occasions an ebullition, and causes any slag it contains to rise to the surface, whence it is skimmed off. The tin is lastly cast into bars or pigs, weighing from 2 to 3 cwt. each.[1]

Qualities.—Tin has a very slight, somewhat disagreeable, taste, and emits a peculiar odour when rubbed. It has the colour and the brilliancy of silver; is very malleable; but has little ductility and tenacity; is easily cut with a knife; and is flexible, producing a peculiar crackling noise when bent backwards and forwards. Its specific gravity, after fusion, is 7·291; and after being hammered, 7·299.[2] It melts at 442 Fahr., but is not volatilized, and on cooling crystallizes in rhombs. Tin exposed to the air soon loses its lustre, and when melted it is oxidized, a gray oxide being formed on its surface, which becomes yellow if the heat be continued; and if raised to a full red heat takes fire, and acquires a pure white colour. It is also oxidized by many acids; and combines readily with sulphur.

Officinal. STANNUM: STANNI LIMATURA. *Lond. Edin. Dub.* The filings and powder of tin.

Tin melted and agitated briskly in a heated mortar with a warm pestle till it cools, or shaken in a wooden box, is reduced to a kind of powder, consisting of small rounded particles, with very little lustre; but still in the metallic state. This is the powder of the pharmacopœias.

Medical properties and uses.—Tin is anthelmintic. It was formerly used in hysteria and hypochondriasis; but its efficacy in these complaints cannot extend beyond its power of dislodgings worms. It is generally supposed to operate mechanically only; but it has been suggested, that "it is not improbable, it may act by generating hydrogen gas in the intestinal canal, which proves noxious to the animal; and its efficacy has been said to be increased by combination with sulphur, by which sulphuretted hydrogen gas will be evolved."[1] For the mode of exhibiting it, see *Pulvis Stanni* among the Preparations.

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[1] *Aikin's Dictionary of Chemistry.*

[2] Brisson.

Officinal preparation. *Pulvis Stanni.* D.

STAPHISAGRIÆ SEMINA. Vide *Delphinium.*

STYRAX. *Spec. Plant. Willd.* ii. 623.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Bicornes *Linn.* Guaiacinæ *Juss.*

G. 874. *Calyx* inferior. *Corolla* funnel-shaped. *Drupe* two-seeded.

Sp. 1. S. *officinale.*[2] Officinal Storax. *Med. Bot. 2d edit.* 291. *t.* 101.

Sp. 3. S. *Benzoin.* Benjamin-tree. *Med. Bot. 2d. ed.* 294. *t.* 102. *Phil. Trans.* lxxvii. 307.

1. STYRAX OFFICINALE.

Officinal. STYRACIS BALSAMUM. *Lond.* STYRACIS BENZOINI BALSAMUM. *Edin.* STYRAX CALAMITA; RESINA. *Dub.* Storax Balsam.

Syn. Storax (*F.*) Storax (*G.*) Storace (*I.*) Aznmbar (*S.*)

The officinal storax-tree is a native of the south of Europe and the Levant; and flowers in July. It rises about fifteen feet in height, sends off many branches, and is covered with a rough gray bark. The leaves, which are about two inches long, an inch and a half broad, and of a bright green on the upper surface, and hoary on the under, are petiolate, alternate, elliptical, pointed, and entire. The flowers are in terminal clusters: the corolla is monopetalous, funnel-shaped, large, and of a white colour: the filaments are placed in a regular circle, and apparently adhere at the base, supporting erect oblong anthers; and the germ is oval with a slender style and simple stigma. The fruit is a juiceless drupe, of an ovate globular form, containing one or two compressed angular nuts.

From this tree storax is obtained in Asiatic Turkey. It issues from incisions made in the bark; and as it was formerly the custom to collect and export it in reeds, it was named Styrax calamita.[3] But only two kinds of storax are now found in the shops, storax in the tear , which is pure storax; and storax in the lump, or red storax, which is mixed with saw dust and other impurities. Both kinds are brought from the Levant in chests and boxes.

Qualities. — Storax has a fragrant odour, and a pleasant, subacidulous, slightly pungent, and aromatic taste. It is of a reddish brown colour, and brittle at the ordinary temperature of the air, breaking with a shining resinous fracture; but soon softens between the fingers, and melts at a low heat, exhaling a strong odour of benzoic acid. In a higher degree of heat it burns with a white flame, and leaves behind a light spongy charcoal. It is deprived of its red colour, and the little transparency it possesses by chewing; and becomes in a remarkable degree, more brittle. To water it imparts a yellow colour, and its odour and taste; but in distillation scarcely any oil is obtained. Alcohol and ether dissolve it completely, leaving only impurities, and the tincture is decomposed by the addition of water. Its constituents are resin, an empyreumatic oil, and benzoic acid.

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[1] Murray. *System of Materia Medica,* i. 490.

[2] Στυραξ Dioscoridis.

[3] The Dublin College retains this appellation, although no storax of this description is now to be met with in the shops.

Medical properties and uses.—Storax is stimulant, and in some degree expectorant. It was formerly much prescribed in asthma, catarrh, phthisis, and menstrual obstructions; but it is now scarcely ever employed, except as an adjunct on account of its fragrance; and, certainly, it cannot be recommended in the above complaints. The dose is from grs. x. to ʒſs.

Officinal preparations. *Styrax purificata.* D. *Pilulæ e Styrace.* D.

2. STYRAX BENZOIN.[1]

Officinal. BENZOINUM. *Lond.* STYRACIS OFFICINALIS; BALSAMUM. *Edin.* BENZOE; RESINA. *Dub.* Benzoin; a balsam.

Syn. Benzoin (*F.*) Benzoe (*G.*) Belzuino (*I.*) Benjui (*S.*) Lubán (*H.* and *Arab.*)

The benzoin or benjamin tree, is a native of Sumatra. It is a tall tree sending off many round branches, which are covered with a whitish downy bark. The leaves are alternate, on round, striated, tomentose petioles, oblong, quite entire, pointed, veined, smooth above, and tomentose beneath. The flowers are in compound axillary clusters, nearly as long as the leaves; with the common peduncle tomentose; the partial alternate, spreading, and tomentose: the pedicels short; and the flowers all hanging on the same side. The calyx is bell-shaped, short, and downy; the corolla consists of five linear obtuse petals, four times longer than the calyx, connected together at the base, and externally cineritious. The filaments are ten, a little shorter than the petals, connected at the base, and supporting linear erect anthers: the germen is superior, ovate, and downy, with a slender style and double stigma.

Benzoin is obtained from this tree by wounding the bark near the origin of the lower branches. The tree is never wounded under six years of age; and cannot sustain these annual incisions above twelve years. A tree yields about three pounds of balsam annually. It is brought to this country in large masses packed in chests and casks.

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[1] Benzoin was long supposed to be the produce of a species of Laurus, a native of Virginia, which on this account was named L. *Benzoin*: this error was detected by Linnæus; but the real genus of the plant which yields it was first assigned by Mr. Dryander, *Phil. Trans.* lxxvii. 307.

Qualities. — Benzoin has a very agreeable fragrant odour; but scarcely any taste. Its specific gravity is 1·092. The mass is white and brownish, or yellowish, somewhat translucent, brittle, and breaks with a resinous fracture. When heated it exhales white fumes of a very fragrant, pungent odour, which are volatilized benzoic acid. Boiling it in water, lime and water, or solutions of the mixed alkalies, extracts the benzoic acid it contains, which can be afterwards separated by the addition of an acid. Sulphuric acid dissolves benzoin, and benzoic acid sublimes. Nitric acid assisted by heat dissolves it with violence, and the solution, on cooling, becomes turbid, and crystals of benzoic acid separate. In both these processes artificial tannin also is formed. Alcohol and ether readily dissolve this balsam, which is again precipitated from the tincture, in the form of a white powder, by the addition of water. According to Mr. Brande's analysis, 100 parts of benzoin distilled alone, yield of benzoic acid 9·0. Acidulous water 5·5. Butyraceous empyreumatic oil 60·0. Charcoal 22·0. Carburetted hydrogen and carbonic acid 3·5 parts.[1]

Medical properties and uses. — Benzoin is regarded as expectorant; and was formerly employed in asthmas and other pulmonary affections; but it is scarcely ever ordered in modern practice; and is principally used for preparing the acid.

Officinal preparations. *Acidum benzoinum.* L. E. D. *Tinctura Benzoini composita.* L. E. D.

SUCCINUM.[2] *Lond. Edin. Dub.* Amber.

Syn. Succin (*F.*) Ambra (*I.*) Ambar (*S.*)

This substance is dug out of the earth in Ducal Prussia, near the sea coast; and is thrown in considerable quantity on the sea shore of Polish Prussia and Pomerania, particularly after tempestuous west or north-west winds.[3] It is evidently of vegetable origin, and the lumps occasionally inclose small pieces of twigs and insects in their substance. The greater part of what is brought to this country comes from the Baltic; and a small quantity from Catania, in Sicily, packed in chests.

Qualities. — Amber is insipid, and also inodorous, except when heated, when it emits a fragrant odour. It is brittle, light, hard, and transparent; with a considerable degree of lustre; is commonly of a golden yellow or brown colour, but occasionally colourless, and is electric. Its specific gravity is 1·065. It softens when heated, and in a strong heat burns, leaving few ashes. It is nearly insoluble in water, to which, however, it gives, when it is boiled with it, a sweetish odour, a yellow colour, and a bitter taste. Alcohol takes up about one-eighth part of amber, forming a tincture which is rendered milky by the addition of water, and precipitates a resin. The alcoholic solution contains a free acid. With boiling fixed alkalies it forms a soap; and even a cold weak solution of potash dissolves it, requiring, however, a considerable length of time. Sulphuric acid converts amber into a black resinous mass. Nitric acid, assisted by heat, acts violently upon it; nitrous gas is emitted, and the amber is ultimately entirely dissolved. Its constituents appear to be chiefly resin, an empyreumatic oil, and succinic acid.

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[1] *Nicholson's Journal*, x. 86. *Thomson's Chemistry*, 4th ed. v. 129.

[2] Ηλεκτρον Græcorum.

[3] It is found in small quantities on the east coast of Britain; and small pieces of it are occasionally found in the gravel-pits round London. The largest mass of amber ever found, was met with near the surface of the ground in Lithuania. It weighs 18lbs. and is preserved in the royal cabinet at Berlin.

Use. — Amber, although it was in high estimation among the ancients as a medicine, is now only used in pharmacy for the purpose of obtaining the oil and acid which it yields by distillation.

Officinal preparations. *Acidum succinicum.* E. D. *Oleum Succini.* L. E. D.

SUL'PHUR. *Lond.* SULPHUR SUBLIMA'TUM. *Lond. Edin. Dub.* Sulphur. Sublimed Sulphur.

Syn. Soufre (*F.*) Schwefel (*G.*) Zolfo; Solfo (*I.*) Azufre (*S.*) Kibreet (*Arab.*) Ghéndaguno (*Tam.*) Gandhaca (*San.*)

Sulphur is found native in the neighbourhood of volcanoes; and sometimes, although rarely, in veins traversing primitive rocks. At the Solfatara near Naples, it is dug up in a state of comparative purity, being mixed with a white earth only, from which it is separated by sublimation, and the sulphur thus freed is melted, and cast into moulds forming the roll sulphur of commerce. It is imported into this country chiefly from Sicily[1] and Naples: but a large proportion of what is used in this country is obtained from the roasting of pyrites. At the Pary's mines in Anglesea were works for this purpose on a large scale; where, in working the copper pyrites, the sulphur volatilized in the roasting, was collected in chambers which were connected with the domes of the furnaces by means of horizontal flues. Each chamber had a door, by means of which it was cleared of the sulphur once in six weeks. This is the general mode of obtaining sulphur from pyrites, and thus procured, it is in rough, pulverulent, spongy crusts, of a dirty grayish yellow colour. In order to purify it, the crusts are broken and thrown into a boiler, in which it melts; and after the impurities are separated by skimming and subsidence, it is cast into cylindrical moulds, forming roll sulphur; or into cones about two feet high, which form the loaf sulphur of commerce.[1]

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[1] In Sicily it is procured from *Samattino, Gallati, Trabria, Pentellaria, Licati, Salato, Palmo, Tavara, Girgenti,* and *Falconara.*

The common English roll sulphur is said often to contain a full fifteenth part of orpiment, while the Sicilian sulphur contains seldom more than 3 per cent. of a simple earth; and therefore is justly preferred. Both of them are purified in the large way by conducting the vapour of melted sulphur into close chambers, where it concretes in the form of a fine powder: but for medicinal use, that which is sublimed by heating in a sand-bath, an earthen cucurbit, charged with roll sulphur, and conveying the vapours to be concreted into a set of aludels placed round the cucurbit is to be preferred. Prepared in either mode it is the *Sulphur sublimatum*[2] of the pharmacopœias.

Qualities. — *Roll sulphur* is a crystallized brittle solid body of a yellow colour, has a peculiar well-known odour when rubbed or heated, and is insipid. It breaks from the heat of the hand, when held in it for a short time; and becomes electrical when rubbed. Its specific gravity is 1·99. *Sublimed sulphur* is in the form of a very bright yellow powder, and contains a minute portion of sulphuric acid, from which it can be separated by washing it with water. Sulphur is fused at 224° Fahr.; and, what is singular, by increasing the heat to 320° it becomes thick and viscid, and the temperature augments to 550°, when copious fumes arise.[3] When heated in the air it inflames at 300°, and burns with a pale blue flame, emits pungent suffocating vapours, and becomes acidified. It is insoluble in water and alcohol; but is soluble in oils, and combines with the alkalies, and many of the earths, and metallic substances. From the experiments of Davy, there is reason to believe that sulphur is a triple compound of oxygen, hydrogen, and a peculiar base.[4]

Medical properties and uses. — Sulphur is laxative, and a stimulating diaphoretic. From the gentleness of its operation on the bowels, it is one of the best means for keeping them lax in hæmorrhoidal affections; and the diaphoresis which it at the same time excites has rendered it serviceable in chronic rheumatism and catarrh, and in atonic gout, rickets, asthma, and other pulmonary affections not attended with acute inflammation. It is supposed that it combines with hydrogen in the stomach. It manifestly transpires through the skin, perhaps, however, in the state of sulphuretted hydrogen, which may be the cause of silver in the pockets of those who take sulphur being blackened. It is specific in scabies and some other cutaneous affections, in which it is applied externally, and taken internally at the same time.

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[1] The *sulphur vivum* of the shops is the impure dregs of this process.

[2] Θειον πεπυρωμενον Dioscoridis.

[3] *Irvine's Chemical Essays*, 475.

[4] *Phil. Trans.* 1809.

The dose may be from ʒj to ʒiij, mixed into an electuary with syrup or treacle, or in milk. To promote its purgative power it may be combined with super-tartrate of potash; and in hæmorrhoidal cases with magnesia.

Officinal preparations. *Sulphur lotum.* L. E. D. *Sulphur præcipitatum.* L. *Unguentum Sulphuris.* L. E. D. *Unguentum Sulphuris compositum.* L.

SUPER-TARTRAS POTASSÆ IMPURUS. *Edin.* TARTARUM. *Lond.* Impure Super-tartrate of potash.

Syn. Tartre (*F.*) Roher Weinstein (*G.*) Tartaro bianco (*I.*) Tartaro (*S.*)

This is a saline matter, which exists in the juice of the grape; and is deposited on the sides of casks of wine, in the form of a crust, during the continuance of the slow fermentation which goes on in wine, till it attains the greatest perfection age can give it. It is well known by the name of *tartar*, and is named red or white tartar, as it is more or less coloured, owing to the nature of the wine from which it is deposited. Besides colouring matter, it contains extractive, potash, combined with tartaric acid in excess, and tartrate of lime. It is only used for preparing the next article.[1] James Day Kennford.

SUPER-TAR'TRAS POTAS'SÆ. *Edin.* POTASSÆ SUPERTARTRAS. *Lond.* TARTARUM CRYSTALLI. *Dub.* Super-tartrate of potash, Crystals of tartar.

Syn. Tartrate acidule de Potasse (*F.*) Gereinigter Weinstein (*G.*) Cremore di tartaro; ossitartrato ossidulo di Potassa (*I.*)

This is the above-mentioned saline crust purified. It is first reduced to powder, then dissolved in boiling water in tubs, and the clear fluid poured off from the sediment. The clear solution is then allowed to remain at rest, when it deposits brown crystals of tartrate of potash, which are boiled in copper vessels with the mother liquor; and clarified by throwing in whites of eggs, and some finely sifted wood ashes. An effervescence immediately takes place, and a red scum is thrown up, which is carefully skimmed off with a perforated skimmer; and the throwing in of the wood ashes, with the subsequent skimming, are repeated for fourteen or fifteen times; after which the liquor is taken from the fire, and allowed to remain at rest for three days. On the fourth day a dirty white saline crust is removed from the surface, and two thirds of the liquor ladled out. The crystals which now form are white and clean, and require no further preparation than drying on a wicker frame. In some places, instead of wood ashes, a portion of pure clay is diffused through the boiling solution. The exposure of the crystals on cloths to the air and light whitens them very considerably.[1]

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[1] A large quantity of tartar comes from Sicily: the white is procured chiefly from *Palermo*, *Marsala*, and *Catania*; the red from *Mascali*, *Messina*, *Melazzo*, and *Vittoria*.

Qualities. Super-tartrate of potash is inodorous, and when allowed to dissolve in the mouth, which it does very slowly, and feeling gritty under the teeth, has a harsh acid taste. Its crystals are small and irregular, generally run together into little masses, which are of a white colour, semi-transparent, brittle, and easily reduced to powder. Its specific gravity is 1·953. It requires for its solution 30 parts of boiling water, and 120 of cold water. The solution decomposes spontaneously by keeping; a mucous matter is deposited, and there remains a solution of carbonate of potash coloured with a little oil.[2] According to the analysis of Thenard, 100 parts of pure supertartrate of potash contain 57 of tartaric acid, 33 potash, and 7 of water[3]; but according to Berzelius, the proportions are, acid 70·45, potash 24·80, and water 4·75.

Medical properties and uses.—This salt is purgative, diuretic, and refrigerant. As a purgative it is frequently employed, on account of its taste being less unpleasant than the generality of saline cathartics; but it is apt to excite too much absorption when long used, producing emaciation, and also disordering the digestive organs. This property, however, of exciting the action of the absorbents, is taken advantage of with great effect in the cure of dropsy, particularly ascites; in which the super-tartrate of potash has been found extremely efficacious. It generally occasions a considerable discharge of serous fluid into the bowels, which is thrown off in the form of watery stools, at the same time that the discharge by urine is much augmented. The water in the cavity of the abdomen is thus rapidly carried off: and the chances of a return of the disease are supposed to be fewer than when other diuretics are employed. We are of opinion, however, that in cases complicated with hepatic obstructions the effects of this remedy are very uncertain. It may be advantageously united with squill; and, owing to the exhaustion it occasions, its use should be followed by preparations of iron, and other tonics. As a refrigerant, super-tartrate of potash dissolved in water, and the solution sweetened with sugar, is a pleasant beverage in febrile diseases, when its purgative quality is not likely to prove injurious. As a purgative and hydragogue the dose is from ʒiv to ʒvj, in the form of electuary; and this dose for the latter purpose must be repeated until the kidneys are affected; diluting freely during its use.

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[1] Schaub says, it may be purified by simply boiling it with powdered recent charcoal, and very white crystals obtained. *Ann. de Chime,* xlix. 64.

[2] This decomposition was first described by Berthollet, in 1782. *Mem. Par. Thomson's Chemistry,* 4th edit. vol. iii. 93.

[3] *Annales de Chimie,* vol. xxxviii. p. 39.

Officinal preparations. *Ferrum tartarizatum.* L. D. *Potassæ Tartras.* L. E. D. *Antimonium tartarizatum.* L. E. D. *Soda tartarizata.* L. E. D.

SUS. *Syst. Nat. Gmelin.* i. 217.

Cl. 1. *Ord.* 6. Mammalia Belluæ.

G. 35. *Fore-teeth* four in the upper jaw converging, and six prominent in the lower jaw. *Tusks* two shorter in the upper jaw; and two in the under jaw displayed. *Snout* truncated, prominent, moveable. *Feet* cloven.

Species 1. Sus *Scrofa.*[1] The Hog. *Jonst. quadr.* 99. t. 47.

Officinal. A'DEPS. *Lond.* ADEPS SUILLUS. *Edin. Dub.* Fat. Hog's lard.

Syn. Sain doux (*F.*) Schweineschmalz (*G.*) Lardo (*I.*) Pringue (*S.*) Púnnie Colupoo (*Tam.*)

The hog is too well known to require a particular description. It is an inhabitant of the greater part of the temperate regions of the globe; the wild and the domestic being varieties of the same species; and of both there are several sub-varieties. The period of gestation of the sow is four months, and the offspring numerous, occasionally exceeding twenty at a litter, which the boar sometimes devours. The hog does not shed its teeth, and seldom lives beyond twenty-five or thirty years. It is much infested with vermin; and is subject to several diseases, particularly hydatid dropsy, scrophula, and scabies. Its food is of a vegetable nature; but it is asserted that pepper kills it. As an article of diet, the flesh of the hog, when the animal has been castrated and properly fed[2], is very palatable, and not unwholesome; and when salted, keeps better than most other meats. But the frequent use of pork is said to favour obesity, and occasion disorders of the skin, particularly in the sedentary. The lard, which is the officinal part of the hog, is obtained chiefly from the flank of the animal. To free it from the membranes and vessels, it is cut in small pieces, then very well washed in water, until the water comes off colourless, and afterwards melted with a very gentle heat in a shallow vessel, continued on the fire till the whole of the water is evaporated. While melted, it is run into bladders, in which it concretes; and is thus brought to market.

Qualities.—Lard is inodorous, tasteless, and white; soft, and nearly semifluid. Exposed to a heat of 97° it melts, and concretes again when cooled. It is insoluble in water, alcohol, and ether: but is dissolved by the strong acids, being at the same time decomposed; and, like the fixed oils, it combines with the alkalies and forms soap. It is oxidized, if, when melted, a little nitric acid be stirred into it; and assumes a greater degree of firmness, with a yellow colour. By destructive distillation it affords results very similar to those obtained from the analysis of fixed oil; and appears to be a compound of oxygen, hydrogen, and carbon in unknown proportions. From the experiments of Chevreul, it appears to consist of a mixture of two distinct oily substances; one of which is solid at the usual temperature, and has been named by him *stearin*; and the other liquid, which he has named *elaïn*. The proportion in 100 parts of lard, is, of stearin 38, elaïn 62 parts.[1] When lard is long exposed to a warm air, it becomes yellow, emits a fœtid odour; and, owing to oxygen being attracted from the atmosphere, the sebacic acid is formed. This state of rancidity may, in some degree, be removed by washing it with very pure soft water; which during the operation becomes acid, and reddens litmus paper.

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[1] ῾Υς Aristotle.

[2] The qualities of the flesh depend much on the diet of the animal. Pork fed at a flour mill is always good: and Russel says, that which is fed near Aleppo on liquorice root, which grows in great abundance in the desert, is fat, delicious, and remarkably digestible.

Medical properties and uses. — Lard is emollient; and owing to its softness and unctuosity is preferable to fat as a friction; but it is seldom used for this purpose; and is chiefly employed in the formation of ointments.

Officinal preparations. *Adeps preparata.* L. D.

SWIETENIA. *Spec. Plant. Willd.* ii. 557.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Trihilatæ. *Linn.* Meliæ *Juss.*

G. 843. *Cal.* five-cleft. *Pet.* five. *Nect.* cylindric, bearing the anthers at the mouth. *Capsules* five-celled, woody, opening at the base. *Seeds* imbricate, winged.

Sp. 2. S. *Febrifuga.* Febrifuge Swietenia. *Roxburgh, Coromandel Plants,* i. 18. *t.* 17.

Officinal. SWIETENIA FEBRIFUGA; CORTEX. *Dub.* The bark of Febrifuge Swietenia.

Syn. Rahuna (*H.*) Shem mairum (*Tam*)

This is a native of the East Indies, growing in the mountains of Rajahmundry Circar. It is a very lofty tree, with a large shady head, and covered with a gray scabrous bark. The leaves are alternate and abruptly pinnated; composed of three or four pairs of opposite, petiolated, oval, obtuse leaflets; each from three to five inches long, and from two to three broad, smooth, shining, and the lower side extending a little further down on the petiole than the upper side: the flowers are middle-sized, white, inodorous; and disposed in large, terminating, diffuse panicles, furnished with minute bractes: the calyx is inferior: the nectary scarcely half the length of the petals and bellied; the filaments are very short, and inserted just within the mouth of the nectary: the germ is conical, bearing a thick tapering style, supporting a large targeted stigma, which shuts up the mouth of the nectary: the capsule is large, ovate, and five-valved, with the valves gaping from the top.

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[1] *Annales de Chimie*, t. 94. p. 129.

Qualities. — The bark of febrifuge Swietenia is very bitter and austere, yet is not nauseous. It is brittle, compact, of a light red colour internally, and externally covered with a rough, gray, inert epidermis. Water extracts its virtues both by infusion and coction, and yields an astringent extract resembling kino; they are partially taken up by alcohol, and the aqueous and spirituous preparations do not suffer decomposition when mixed.

Medical properties and uses. — The bark of this species of Swietenia are astringent and tonic. In India, it is used for the cure of intermittents, with considerable advantage; and has also been found efficacious in most of the diseases in which the cinchona bark proves serviceable. It is very little employed in Europe, and is not found generally in the shops. The dose, in substance, pulverized, is half a drachm.

TAMARINDUS. *Spec. Plant. Willd.* iii. 577.

Cl. 16. *Ord.* 1. Monadelphia Triandria. *Nat. ord.* Lomentaceæ *Linn.* Leguminosæ *Juss.*

G. 1250. *Calyx* four-parted. *Petals* three. *Nectary* of two short bristles under the filaments. *Legume* pulpy.

Sp. 1. T. *indica.* The Tamarind tree. *Med. Bot. 2d ed.* 448. *t.* 161. (Balam-pulli) *Rheede, Hort. Malab.* i. 39. *t.* 23.

Officinal. TAMARINDI PULPA. *Lond.* TAMARINDI INDICÆ FRUCTUS. *Edin.* TAMARINDUS; FRUCTUS. *Dub.* The pulp, or preserved fruit of the Tamarind.

Syn. Tamarins (*F.*) Tamarinden (*G.*) Tamarindo (*I.*) Tamarindo (*S.*) Umblie (*H.* & *Arab.*) Amlica (*San.*)

This tree is a native of the East and West Indies, of Arabia, and Egypt. It is a large beautiful spreading tree. The leaves are abruptly pinnate, composed of sixteen or eighteen pairs of sessile leaflets, half an inch only in length, and one-sixth of an inch broad, of a bright green colour, downy, oblong, entire, and obtuse: the flowers are in loose bunches of five or six, which come out from the sides of the branches: the calyx is of a straw yellow colour, and deciduous: the petals also yellowish, and beautifully variegated with red veins; ovate, concave, acute, indented, and plaited at the edge; and the filaments purplish, bearing incumbent brownish anthers: the pods are thick, compressed, and of a dull brown colour when ripe: those from the West-Indies from two to five inches long, with two, three, or four seeds; those from the East Indies are twice as long, and contain five, six, or seven seeds: the seeds in both are flat, angular, shining, and lodged in a dark pulpy matter.

In the West Indies the pods are gathered in June, July, and August, when fully ripe; and the fruit being freed from the shelly fragments, is placed in layers in a cask, and boiling syrup poured over it, till the cask is filled: the syrup pervades every part quite down to the bottom, and when cool, the cask is headed for sale.[1] The East India tamarinds are darker coloured and drier, and are said to be preserved without sugar. When tamarinds are good, they are free from any degree of mustiness; the seeds are hard, flat, and clean; the strings tough and entire; and a clean knife thrust into them does not receive any coating of copper. They should be preserved in closely covered jars.

Qualities. — Tamarinds are inodorous, and have an agreeable acid sweetish taste. According to the analysis of Vauquelin the pulp contains, independent of the sugar with which it is mixed, supertartrate of potash, gum, jelly, citric acid, tartaric acid, malic acid, and a feculent matter. The acid taste chiefly depends on the citric acid, the quantity being greater than that of the others; ℥xvj of the prepared pulp containing ℥jſs of citric acid, but only ʒij of tartaric acid, ℥ſs of supertartrate of potash, and ʒſs of malic acid.

Medical properties and uses. — Tamarind pulp is refrigerant, and gently laxative. The simple infusion of the pulp in warm water, or a whey made by boiling ℥ij of it in two pints of milk, and straining, form very grateful refrigerant beverages, which are advantageously used in febrile diseases. The dose of the simple fruit required to act upon the bowels is so large that it is seldom given alone as a purgative, but is generally combined with cassia or manna, the action of which it augments; or with such of the neutral purgative salts as are not decomposed by it; which is the case with those that have potash for their base, and are therefore incompatible in mixtures with this fruit. It forms an agreeable addition to infusion of senna; but the purgative power is weakened by it.

Officinal preparation. *Infusum Tamarindi cum Senna.* E. D.

TANACETUM. *Spec. Plant. Wild.* iii. 1809.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Discoideæ *Linn.* Corymbiferæ *Juss.*

* *Discoid.*

G. 1472. *Receptacle* naked. *Pappus* sub-marginate. *Calyx* imbricate, hemispherical. *Calyx* rays obsolete[2], trifid.

Species 18. T. *vulgare.*[3] Common Tansy. *Med. Bot. 2d ed.* 67. *t.* 27. *Smith Flor. Brit.* 862. *Eng. Bot.* 1229.

Officinal. TANACETI VULGARIS FLORES FOLIA. *Edin.* TANACETUM, FOLIA. *Dub.* The leaves of Common Tansy.

Syn. Tanassie (*F.*) Rainfern (*G.*) Tanaceto (*I.*) Atanasia (*S.*)

This is an indigenous perennial plant, growing on hills, and by the sides of roads and fields; flowering in July and August: but it is generally cultivated for medicinal and culinary purposes. The root is creeping; sending up stiff erect stems, about two feet in height, leafy, obscurely hexagonal, and striated; with alternate leaves, doubly pinnatifid, acutely cleft, somewhat downy on the under side, eared at the base, and embracing the stem: the flowers are in terminal corymbs, of a bright yellow colour, and flattish: the leaflets of the calyx are obtuse, with a dry scaly margin: the florets are numerous; those of the disc hermaphrodite and five-cleft, those of the margin female and trifid: the seeds are small, uniform, inversely pyramidal, pentagonal, ribbed, of an ash colour; and crowned with a narrow, marginate, membranous pappus.

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[1] *Long's Jamaica*, iii. 729.

[2] Radius *calidiore æstate prodit. Willedenow,* l. c.

[3] Αρτεμισια λεπτοφυλλος Dioscoridis.

Qualities. — Tansy has a strong peculiar fragrant odour, and an acrid bitterish taste, somewhat resembling that of camphor. These qualities it yields both to water and alcohol; and in distillation with water affords a greenish yellow essential oil, which has in perfection the odour of the plant, and probably contains camphor.

Medical properties and uses. — The leaves and flowers of tansy are tonic and anthelmintic. It was formerly regarded as a powerful remedy in intermittents, dropsy, hysteria, and obstructed menstruation; but experience and the knowledge of better remedies have set aside its use in these diseases. An infusion of the whole herb in boiling water has been highly extolled as a preventive of the return of gout[1]; but it is now scarcely ever used, except as an anthelmintic for expelling lumbrici, to which it has certainly some pretensions. The dose of the leaves in powder is from ℈j to ʒj, twice a day.

TEUCRIUM. *Spec. Plant. Willd.* iii. 13.

Cl. 14. *Ord.* 1. Didynamia Gymnospermia. *Nat. ord.* Verticillatæ. *Linn.* Labiatæ *Juss.*

G. 1093. *Corolla* no upper lip, but a fissure in place of it. *Stamens* protruded.

Species 12. T. *Marum.* Common Marum. *Med. Bot. 2d ed.* 324. *t.* 115.

Species 36. T. *Chamædrys.* Wall Germander. *Med. Bot. 2d ed.* 358. *t.* 130.

1. TEUCRIUM MARUM.[2]

Officinal. MARUM SYRIACUM; HERBA. *Dub.* The herbaceous part of Common Marum.

Syn. Herbe au Chat (*F.*) Arisberkraut (*G.*) Maro (*I.*)

This plant is perennial, a native of Spain and Syria, but cultivated in our gardens.[3] It has a low, shrubby stalk, sending out many woody hoary branches; and in its proper soil and climate rises three or four feet in height. The leaves are small, and placed opposite at each joint, pointed, and sometimes nearly three-lobed; green on the upper surface, and hoary beneath: the flowers, which are in loose terminal whorled spikes, are very downy, and of a bright red colour.

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[1] Clarke, *Essays Physical and Literary*, iii. 438.

[2] Ὑσοβριον Dioscoridis.

[3] It appears to have been cultivated in Britain so early as 1640.

Qualities. — The leaves rubbed between the fingers have a volatile aromatic odour, which readily excites sneezing; their taste is bitterish, pungent, and acrid, depending on a volatile oil which can be obtained separate by distillation with water.

Medical properties and uses.— This plant is an useful errhine; and as it possesses no narcotic property, is in some cases preferable to tobacco. It is generally a component in sternutatory powders.

Officinal preparation. *Pulvis Asari compositus.* E. D.

2. TEUCRIUM CHAMÆDRYS.

Officinal. CHAMÆDRYS HERBA. *Dub.* Wall Germander.

Syn. Petite Chêne (*F.*) Camedrio (*I.*) Camedrey de agna (*S.*)

This is an indigenous perennial plant, growing on old [1]ruins and walls; flowering in June and July. It has a creeping root: the stems are nearly erect, branched, round, leafy, and hairy: the leaves subovate, cut, crenate, hairy, veined, and attenuated at the base: the flowers are axillary: the calyx is rough, with pointed segments: the corolla of a purple colour, bilabiate, with the upper lip short and cut in the middle, and the lower separated into spreading lobes, the central of which is large and roundish.

Qualities. — The recent leaves have a slight aromatic odour, which is dissipated by drying; their taste is moderately bitter. Water extracts its active matter completely; alcohol only partially.

Medical properties and uses. — Wall germander has been accounted tonic, stomachic, diuretic, and emmenagogue; and is said to prove efficacious in uterine obstructions, agues, gout, and rheumatism[2]; but it is perhaps, not improperly neglected, being scarcely ever ordered. The dose of the pulverized herb may be from grs. x to ʒj, given three or four times a day.

TOLUIFERA. *Spec. Plant. Willd.* ii. 545.

Cl. 10. *Ord.* 1. Decandria Monogynia. *Nat. ord.* Terebintaceæ *Juss.*

G. 828. *Calyx* five-toothed, bell-shaped, *Petals* five, the lowest one the largest, obcordate. *Style* none.

Species 1. T. *balsamum.* Balsam of Tolu-tree. *Med. Bot. 2d ed.* 607. *t.* 215.

Officinal. BALSAMUM TOLUTANUM. *Lond. Dub.* TOLUIFERÆ BALSAMI BALSAMUM. *Edin.* Balsam of Tolu.

Syn. Beaume de Tolu (*F.*) Tolutanischer Balsam (*G.*) Balsamo Tolutano (*I.*)

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[1] Winchelsea Castle. Walls of Norwich near Magdalen gate. *Smith.*

[2] Charles V. is said to have been cured of severe rheumatism by a vinous decoction of this plant, taken daily for sixty days.

The Tolu tree is a native of South America, growing behind Carthagena, in the province of Tolu. It is a large branching tree, covered with a rough gray bark: the leaves are on short petioles, alternate, elliptical, entire, pointed, and of a light green colour: the flowers are in lateral clusters, each on a slender pedicel: the calyx is bell-shaped, with one of the teeth produced beyond the others: four of the petals are equal, linear, and a little longer than the calyx; the fifth is large, inversely cordate, and with a claw the length of the calyx: the filaments are short, and support large anthers: the germen is oblong, with a sessile pointed stigma: the fruit is a round berry the size of a pea.

The balsam is obtained from incisions of the bark, from which it flows freely in hot weather; and is afterwards put into small gourd-shells, in which state it is brought to this country.

Qualities.— Balsam of Tolu has an extremely fragrant lemon odour, and a warm somewhat sweetish taste. It is of a yellow reddish brown colour, and of a thick tenacious consistence, becoming solid and brittle by age. Exposed to heat it melts, easily inflames, and disperses with its peculiar odour that of benzoic acid. In distillation with water it yields a small portion of volatile oil, impregnates the water with its odour, and by continuing the process benzoic acid sublimes. It is soluble in alcohol, forming a tincture which is rendered milky by water, but no precipitate falls. Mr. Hatchett, found that when it is dissolved in the smallest quantity of solution of potash, its own odour is lost, and it acquires a permanent fragrant smell resembling that of the clove pink. When digested in sulphuric acid, a considerable quantity of pure benzoic acid sublimes; and the same occurs during its solution in nitric acid, which also evolves traces of prussic acid.

Medical properties and uses.— Tolu balsam is a stimulating expectorant; and although less heating than the other balsams, is nevertheless improper in pulmonic affections attended with inflammation. It forms an elegant addition to more active medicines in cases of asthma and chronic catarrh: and on the whole is more employed on account of its agreeable flavour, than for any efficacy it possesses. The dose of the balsam may be from v. to ʒſs, suspended in water by means of mucilage or yolk of egg.

Officinal preparations. *Tinctura Benzoini composita.* L. E. D. *Tinctura Toluiferæ Balsami.* E. D. *Syrupus Tolutani.* L.

TORMENTILLA. *Spec. Plant. Willd.* ii. 1112.

Cl. 12. *Ord.* 5. Icosandria Polygynia. *Nat. ord.* Senticosæ *Linn.* Rosaceæ *Juss.*

G. 1001. *Calyx* three-cleft. *Petals* four. *Seeds* roundish, naked, affixed to a small juiceless receptacle.

Species 1. T. *erecta*. Common Tormentil, or Septfoil (*officinalis*). *Smith Flora Brit.* 552. *Eng. Bot. t.* 863. *Med. Bot. 2d edit.* 503. *t.* 181.

Officinal. TORMENTILLÆ RADIX. *Lond. Dub. Edin.* Tormentil Root.

Syn. Tormentille (*F.*) Tormentilwurzel (*G.*) Tormentilla (*I.*)

This is a very common indigenous perennial plant, growing in dry pastures and on heaths; flowering in June and July. The root is woody: the stems are erect, branched, diffuse or procumbent, round and leafy: the leaves are nearly sessile, ternate, lanceolate, serrated, and hairy, accompanied by deeply incised stipules: the flowers are on long, capillary, opposite, solitary, one-flowered peduncles: the calyx consists of ovate, hairy, alternately larger and smaller segments, the latter of which are exterior: the petals have short claws, are obcordate and of a golden yellow colour: the seeds are few, and wrinkled.

Qualities — The root has a very slightly aromatic odour, and an austere styptic taste. It is knotty: externally blackish, and internally reddish. To boiling water it yields its active matter, which appears to be chiefly tannin as the infusion is copiously precipitated by solution of isinglass, and strikes a deep black with sulphate of iron. Except galls and catechu, it contains more tannin than any other vegetable.

Medical properties and uses. — Tormentil root is a powerful astringent. It has been employed with success in intermittents, but more efficaciously in diarrhœas; particularly those attendant on phthisis, as it produces its astringent effects without increasing the general excitement. As a local remedy it may be advantageously used in the form of gargle and lotion in ulcerations of the tongue and mouth, against spongy gums, and as an application to fœtid ill-conditioned sores: but it is seldom used. It may be given in substance, or in the form of decoction. The dose of the powdered root is from ʒſs to ʒj.

TRITICUM. *Spec. Plant. Willd.* i. 476.

Cl. 3. *Ord.* 2. Triandria Monogynia. *Nat. ord.* Gramina.

G. 152. *Calyx* two-valved, solitary, subtriflorous. *Flower* somewhat obtuse.

* *annual.*

Species 2. Triticum *hybernum*, Winter Wheat. *Gærtner de Fructibus.*

Officinal. FARINA. AMYLUM. *Lond. Edin.* TRITICUM; SEMINUM FARINA; AMYLUM. *Dub.* Wheat Flour. Starch.

Syn. Farine du froment; Amidon (*F.*) Weitzenmehl; Kraftmehl, Staerhe (*G.*) Farina di Frumento l' Amido (*I.*) Acemite; almidon (*S.*)

The country whence this valuable grain originally came is unknown; but it is certain that Sicily was the part of Europe where it was first cultivated. It will not vegetate beyond the

62° degree of northern latitude. It has two sets of roots; one set proceeding directly from the seed, and the other from what is denominated the *corona* of the plant, about two inches above the first: the *coronal* roots do not shoot till spring-time, and collect more nutriment than the *seminal* roots [1]; the ears or spikes are long, with the grain lodged in four rows, and imbricate: the chaff smooth, bellied, and terminated by very short awns, distinguishing it from spring wheat (*Triticum æstivum*), which has awns three inches long. Many varieties of wheat are cultivated in this country, of which the *white Dantzic* is considered the best. The grain is small and translucent, and yields flour which makes more bread than that of any other variety of wheat. After the operation of grinding, the farinaceous part of the seed is separated, by means of cloth sieves, into several distinct portions of various degrees of fineness; but the whole may be resolved into two: 1. *flour*, which constitutes more than two-thirds of the whole; and 2. *bran*, which consists chiefly of the husk of the seed.

Starch is manufactured by steeping either entire or coarsely bruised wheat in cold water, until it swells, and yields a milky juice when squeezed. It is then subjected to pressure in coarse bags placed in vats filled with water; and when all the milky juice is obtained, the bags are removed, and the fecula deposits itself. In a short time the supernatant liquor ferments, and alcohol and acetic acid are formed in it. The whole is now put into tubs called frames, in which the impure fecula is allowed to subside; and after the water is poured off, the upper part of the sediment which last subsided being dirty and discoloured, is scraped off from the starch below: this is then repeatedly well washed, pressed in cloths, and dried by a gentle heat, during which it cracks into small columnar masses, and is the finest white starch of the shops.[2]

Qualities.—*Flour* is inodorous and nearly insipid. Water with which it has been macerated acquires an opaline colour and a sweetish taste; affords precipitates with infusion of galls and the strong acids, and rapidly becomes sour. It appears to contain gluten, sugar, gum, albumen, and phosphate of lime; besides fecula or starch that remains insoluble. According to Vogel the constituents of flour are, in 100 parts, fecula 68, gluten 24, saccharine gum 5, albumen 1·50. The action of these principles on each other, when flour is kneaded with water, and yeast added to the mass, excites the panary fermentation, and produces bread, a little salt being added to give it sapidity. The large proportion of gluten in wheat flour renders it fitter for this purpose than any other kind of flour. During the process a large quantity of carbonic acid gas is evolved, which swells up the mass, and gives it the sponginess and lightness that characterize well-baked bread.[1] For the purpose of baking bread a heat of 488° is required.

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[1] *Hunter's Georgical Essays*, Essay v.

[2] The ordinary blue starch, which is coloured with a solution of smalt and alum in water, is unfit for medicinal uses. The Chians first made starch.

Starch is inodorous and insipid; in white columnar masses which are easily reduced to powder. It is insoluble in alcohol, ether and cold water; but in the latter it falls to powder. Boiling water dissolves it, forming an insipid, inodorous semi-transparent, opaline, gelatinous-like paste, which becomes brittle and opaque, when spread out in a dry air; but when exposed, without being spread out, it separates into a watery fluid, and an opaque paste; sours, and becomes mouldy. Alcohol precipitates starch white and tough from its solutions; acetate of lead and infusion of galls also throw it down, but the precipitate formed by the latter is re-dissolved by heating the liquid to 120°. Although potash dissolves starch, yet the solution of it is not altered by potash, carbonate of potash, nor ammonia: but a solution of potash in alcohol, and a solution of sulphuret of potash in alcohol, both produce precipitates. From the products obtained from distilling starch *per se*, it appears to be a ternary compound of carbon, oxygen, and hydrogen.

Medical properties and uses—The utility of *bread* as an article of diet requires no particular notice: as a medicinal agent it is used for forming poultices, cataplasms, and for giving bulk and form to very active medicines which require to be given in minute doses, in the solid state, or as pills. When toasted and infused in water, it gives a pleasant flavour to the fluid, and renders it more acceptable as a diluent in febrile diseases, and as the ordinary beverage of the dyspeptic. *Starch* is less nutritive than bread, but is perhaps more digestible. It forms the greater part of the nutritive matter of the different farinaceous substances which are in general use as the diet of the sick, such as sago, salep, tapioca, arrow root, and gruel, which are only different modifications of starch. The solution of starch is employed medicinally as a demulcent; but as it is very readily acted on by the stomach, it cannot be of much service in involving acrid matters in the intestines, when taken by the mouth. In the form of enema, however, it is often and advantageously used for allaying the effects of acrid bile on the coats of the rectum in bilious diarrhœa and dysentery; and for sheathing the rectum in cases of abrasion, and inflammation of the gut. It is the common vehicle for the exhibition of opium per anum.

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[1] The method of making leavened bread was probably invented by the Egyptians; for it appears that the Israelites were acquainted with it after they sojourned in Egypt, but not before. It was known to the Greeks during the Trojan war: but the use of yeast or *barm* was discovered by the ancient Gauls.

Officinal preparations. *Mucilago Amyli.* L. E. D.

TUSSILAGO. *Spec. Plant. Willd.* iii. 1962.

Cl. 19. *Ord.* 2. Syngenesia Superflua. *Nat. ord.* Compositæ Discoideæ *Linn.* Corymbiferæ *Juss.*

G. 1483. *Receptacle* naked. *Pappus* simple. *Calyx* scales equal, as long as the disk, submembranaceous. *Corolla* female. *Florets* ligulate, toothless.

Species 12. T. *Farfara.*[1] Common Coltsfoot. *Med. Bot. 2d ed.* 45. *t.* 18. *Smith Flor. Brit.* 878. *Eng. Bot. t.* 429.

Officinal. TUSSILAGO. *Lond.* TUSSILAGINIS FARFARÆ FOLIA ET FLORES. *Edin.* TUSSILAGO; FOLIA. *Dub.* Coltsfoot leaves and flowers.

Syn. Tussilage; Pas d'Ane (*F.*) Huflattisch (*G.*) Farfara (*I.*) Unã de caballo (*S.*)

Coltsfoot is an indigenous perennial plant, growing in moist, marly, and clayey soils. It flowers in March and April, and the leaves appear in May and June. The root is long and diffusely creeping, and sends up stems or scapes destitute of leaves, erect, five or six inches high, simple, unifloral, tomentose, with sparse, smooth, scale-like bractes of a brownish pink colour, lying close to the stem: the flower droops before it blows, but afterwards becomes erect, and is of a golden yellow colour: the calyx is composed of linear, trinerved, plane, smooth, purplish scales, the length of the disc equal, uniform, and finally reflex: the florets of the ray are numerous, spreading, linear, twice the length of those of the disc, with a more slender stigma: the seeds are smooth, more frequently abortive, particularly in the disc; with the seed-down sessile, rough, white, and shining: the receptacle is pitted, flat at first, but finally convex: the leaves appear after the flower, are radical, petiolate, erect, cordate, angled, and toothed; smooth, green above with reddish veins, but underneath white and woolly.

The leaves are more frequently employed than the flowers, and should be gathered and dried when they are fully expanded, before they have attained their greatest magnitude.

Qualities.—The dried leaves are inodorous, and have a rough mucilaginous taste. The mucus they contain is yielded to water by coction, and evolves by the boiling a peculiar odour.

Medical properties and uses.—Tussilago is demulcent, and has been regarded as expectorant from the earliest ages, having been smoked through a reed in the days of Dioscorides, with the view of relieving the chest from accumulated mucus in catarrh, asthma, and phthisis. It is still used as a demulcent in catarrhal and phthisical affections; but very little reliance is placed on its powers. Cullen thought he perceived good effects result from the use of the expressed juice of the recent leaves in scrophula; but his observations have not been generally confirmed.[1]

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[1] Βηχιον Dioscoridis. The name is derived from βὴξ, *tussis*, whence *tussilago*; showing the early opinion of the pectoral virtues of this plant.

The decoction of the leaves is the usual form of exhibiting tussilago. A handful of the leaves is boiled in 0ij of water to 0j; and the decoction after being strained is sweetened with sugar-candy or syrup. The dose is a teacupful.

VALERIANA. *Spec. Plant. Willd.* i. 175.

Cl. 3. *Ord.* 1. Triandria Monogynia. *Nat. ord.* Aggregatæ *Linn.* Dipsaceæ *Juss.*

G. 75. *Corolla* monopetalous, gibbous on one side of the base, superior. *Seed* one.

* *valerians, with a single downy seed.*

Species 6. V. *officinalis.* Officinal, or great Wild Valerian. *Med. Bot. 2d edit.* 77. *t.* 32. *Smith Flora Brit.* 38.

Officinal. VALERIANÆ RADIX. *Lond. Dub.* VALERIANÆ OFFICINALIS RADIX. *Edin.* Wild Valerian root.

Syn. Valeriane (*F.*) Wilde Baldrianwurzel (*G.*) Valeriana Silvestre (*I.*) Valerian officinal (*S.*)

This species of valerian is an indigenous perennial plant, flowering in June. There are two varieties of it; one growing in woods and marshy ground, the other on high pastures and heaths; and the sensible qualities of the second are considerably greater than those of the first. It has been often regarded as the φου of Dioscoridis; but Sibthorp has proved this opinion to be erroneous, and has described the real valerian of the ancients as a distinct species under the name of Valeriana [2]*Dioscoridis.* The roots of valerian are long slender fibres, issuing from heads the stems rise three or four feet in height; are round, grooved, hollow, and terminated with flowering branches disposed crosswise: the leaves are larger at the base of the stem, decreasing in size towards the summit; opposite, connate, and bearded at the base below; pinnate, with a terminal leaflet a little larger than the rest; all the leaflets deeply veined and serrated, of a dark green colour on the upper surface, and paler underneath: the flowers are small, in corymbs, odorous, and interspersed with lanceolate, connate, bearded, waved, pale bractes: the calyx is a slight margin at the top of the germen: the corolla tubular, white with a shade of pink, divided at the margin into five reflected obtuse segments: the filaments are spreading with the corolla, and support round yellowish anthers: the style is shorter, with a trifid stigma; and the capsule is crowned with a feathery pappus, purplish at the base, and contains one oblong, ovate, compressed seed.

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[1] *Mat. Med.* ii. 160.

[2] *Silthorp, Flora Græca,* p. 24. t. 33. Dr. Smith, the learned editor of Sibthorp's Work, says, "Hæc est vere *φου* Dioscoridis, a nemine botanicorum recentiorum ante Sibthorp detecta." Willdenow's 7th species, V. *phu,* which was supposed to be the plant of Dioscoridis, does not accord with his description, whereas that of Sibthorp corresponds with it in every particular.

The roots should be dug up in autumn when the leaves decay, or in spring, before they expand; and be preserved in a dry place. Those which grow wild on a calcareous soil are preferable to those that are cultivated. They lose three-fourths of their weight by drying. Cats are allured and delighted with the odour.

Qualities. — Valerian root has a strong peculiar unpleasant odour, and a warm bitter subacrid taste. Trommsdorff has chemically examined it. Its virtues appear to depend on a very liquid greenish white-coloured volatile oil, which from its odour and taste seems to contain much camphor. Its specific gravity at 77° of Fah. is 0·9340; when exposed to light it becomes yellow; a small portion of nitric acid converts it into resin, and a larger dose into oxalic acid. The expressed juice of the root contains starch, extractive, and gum; while the roots deprived of this juice yield a portion of black-coloured resin, but consist chiefly of woody fibre.[1] The active matter of valerian root is extracted by boiling water, alcohol, and solutions of the pure alkalies.

Medical properties and uses. — Valerian root is antispasmodic, tonic, and emmenagogue. It is advantageously employed in hysteria, symptomatic epilepsy, hemicrania, and other affections depending on a morbid susceptibility of the nervous system. We have also found it exceedingly serviceable in hypochondriasis. It may be exhibited in substance combined with a small portion of *mace* or *cinnamon*; or in the forms of infusion or tincture. The extract is a bad form of preparation. The dose of the powdered root may be from ℈j to ʒj, given three or four times a day.

Officinal preparations. *Extractum Valerianæ.* D. *Infusum Valerianæ.* D. *Tinctura Valerianæ.* L. D. *Tinctura Valerianæ ammoniata.* L. E. D.

VERATRUM. *Spec. Plant. Willd.* iv. 895.

Cl. 23. *Ord.* 1. Polygamia Monœcia. *Nat. ord.* Coronariæ *Linn.* Junci *Juss.*

G. 1859. *Hermaphrodite. Calyx* 0. *Corolla* six-petalled. *Stamens* six. *Pistils* three. *Capsules* three, many sided.
Male the same. Rudiment of a pistil.

Species 1. V. *album.* White Hellebore. *Med. Bot. 2d ed.* 753. *t.* 257.

Officinal. VERATRI RADIX. *Lond.* VERATRI ALBI RADIX. *Edin.* HELLEBORUS ALBUS; RADIX. *Dub.* White Hellebore root.

Syn. Hillébore blanc (*F.*) Wiesse Niesswurzel (*G.*) Elliboro blanco (*I.*) Veratro blanco (*S.*)

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[1] *Annales de Chimie*, lxx. 95. *Thomson's Chem.* 5th ed. iv. 225.

Veratrum is a native of the mountainous parts of Greece Italy, Switzerland, and Russia. Those specimens which are cultivated in our gardens flower in July. The root is perennial, fleshy and fusiform, beset with strong fibres gathered into a head: the stem is thick, round, hairy, erect, three or four feet in height, and branching: the leaves are oblong-ovate, about ten inches long, and five broad in the middle; plaited longitudinally, embracing the stem at the base, and of a yellowish green colour: the flowers are in long, terminal spikes, composed of small alternate spikelets, each accompanied with a lanceolate bracte; the flower consists of six persistent petals, of a pale green colour; three of them oblong and lanceolate, with a membranous edge; and three calycinal, which enclose the other three in the bud, one half shorter and heart-shaped, with a small point at the top: the filaments closely surround the germen, diverge and bend down at the summit, and are terminated by yellow quadrangular anthers: the germens are three in each hermaphrodite flower[1]; oblong, with erect, bifid, hairy styles, crowned with flat spreading stigmas. The capsules contain many compressed membranous seeds.

Although the root only is officinal, yet every part of the plant is extremely acrid and poisonous.

Qualities.—The recent root has a strong disagreeable odour, and a bitterish very acrid permanent taste; but the odour is lost by drying. The dry root, as found in the shops, is sliced, the thick part transversely, and the fibrous, longitudinally. The pieces have a dry corrugated, yellowish grey appearance, and break with a short starchy fracture. They are inodorous, and have a slightly bitter taste. When very light and spongy they must be rejected.

Medical properties and uses.—White hellebore is a violent cathartic, emetic, and sternutatory. When taken internally, even in moderate doses, its operation is violent and dangerous; producing, besides hypercatharsis, with bloody stools and excessive vomiting, great anxiety, tremors, vertigo, syncope, sinking of the pulse, cold sweats, and convulsions, terminating, if the dose be large, in death. Its external application to an ulcerated surface, also produces griping and purging. Notwithstanding these effects, veratrum has been exhibited internally, and with advantage in mania, epilepsis, scabies, lepra, and obstinate herpetic eruptions.[2] But the most ordinary use of white hellebore is as a local stimulant; either as an adjunct to errhine powders in lethargic cases and gutta serena; or in the form of decoction as a wash, or mixed with lard as an ointment, in scabies and herpetic eruptions. In every form, however, it requires to be used with caution; and even as an errhine its acrimony should always be obtunded by mixing it with some mild powder, as that of liquorice root or of starch. The dose of the powdered root should not exceed grs. ij; and for errhine purposes grs. ij or iij should be diluted with grs. xij of liquorice powder, and a pinch of it snuffed up the nose for several successive evenings.

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[1] The hermaphrodite flowers are generally on the upper erect spike.

[2] *Medical Communications*, i. 297.

Officinal preparations. *Decoctum Veratri.* L. *Tinctura Veratri albi.* E. *Unguentum Veratri.*

VERONICA. *Spec. Plant. Willd.* i. 54.

Cl. 2. *Ord.* 1. Diandria Monogynia. *Nat. ord.* Personatæ *Linn.* Pedicularis *Juss.*

G. 44. *Corolla* border four-cleft, with the lowest segment narrower. *Capsule* two-celled.

* * *with corymbose racemes.*

Species 30. V. *Beccabunga.* Broad leaved brooklime. *Med. Bot. 2d ed.* 363. *t.* 132. *Eng. Bot.* x. 655. *Smith Flora Brit.* i. 20.

Officinal. BECCABUNGA; HERBA. *Dub.* The herbaceous part of brooklime.

Syn. Beccabunga; Veronique aquatique (*F.*) Bachbungen (*G.*) Anagalide acquatica (*I.*) Becabunga (*S.*)

Beccabunga is an indigenous, perennial plant, common in rivulets and clear ditches, flowering in June. The stem, which is procumbent or floating, and gives off from the joints long, simple fibrous roots, is round, leafy, and, like every other part of the plant, smooth and shining. The leaves are opposite in pairs, on short petioles, oval, serrated, somewhat fleshy, punctured, and of a pale-green colour. The flowers are collected in opposite axillary clusters, and individually supported on delicate footstalks, accompanied by linear lanceolate bractes. The calyx is divided into four acute segments, shorter than the corolla, which is of a very beautiful sky-blue colour, with the tube white. The anthers are whitish, supported on filaments, longer than the style; and the capsule cloven, almost twin. This plant is green throughout the year, but in greatest perfection in the spring.

Qualities.—It is inodorous, and has, when much chewed, a bitterish, slightly astringent taste. The expressed juice reddens in a small degree the more delicate vegetable blues.

Medical properties and uses.—Although brook lime was formerly considered as a good antiscorbutic, yet it is properly disregarded by modern practitioners; and, as Lewis observes, if it be expected to produce any good effect, it should be used as food.

VIOLA. *Spec. Plant. Willd.* i. 1159.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Campanaceæ *Linn.* Cisti *Juss.*

G. 446. *Calyx* five-leaved. *Corolla* five-petalled, irregular, horned at the back. *Anthers* cohering. *Capsule* superior, three-valved, one-celled.

** stemless.*

Species 12. V. *odorata.*[1] Sweet Violet. *Med. Bot.* 2d *ed.* 251. *t.* 89. *Smith Flora Brit.* 245.

Officinal. VIOLÆ FLORES. *Lond. Dub.* VIOLÆ ODORATÆ FLORES. *Edin.* The recent flower of the violet.

Syn. Violette odorante (*F.*) Blaue veilchen (*G.*) Viole Mammole (*I.*) Violeta (*S.*)

This species of the violet is indigenous, growing in shady places; and flowering in April and May. It is a low creeping plant, giving out runners, which root at small intervals; and send up tufts of leaves and flowers. The roots are fibrous. The leaves heart-shaped, with crenated edges, on slender footstalks; the upper surface of a lively green colour, the under paler and downy. The flowers are supported on delicate, quadrangular, channelled flower-stalks about two inches long, furnished with two small bractes, and curved at the summit. The calyx consists of five green leaflets, the two posterior of which are separated by the spur of the corolla. The petals have a deep violet colour, are white at the base, and irregular; the two lateral ones are bearded near the base; and the posterior, which is slightly keeled, has a large spur, enclosing glandular appendices of the corresponding anthers. The anthers are nearly sessile, whitish, flat, supporting orange-coloured membranous expansions that cover the upper part of the germen; which is pyramidal, downy, and crowned with a falcated pistil.

For medicinal and chemical purposes, the sweet violet is cultivated in great abundance at Stratford-on-Avon; but the London herb-shops are supplied chiefly from Kent. As the petals only, separated from the calyx, are brought to market, it is difficult to detect the admixture of the viola *hirta*, an inodorous species, which is often practised. It is not, however, a matter of much importance.

Qualities. — Violets have an agreeable sweet odour, and a very slightly bitter taste. When chewed they tinge the saliva blue, and yield their colour and flavour to boiling water.

Medical properties and uses. — The petals of the violet are gently laxative; and were formerly regarded as anodyne and pectoral: but they are now scarcely ever used except for preparing the syrup, which is given occasionally as a purgative to infants. Their aqueous tincture, and the syrup, are useful and delicate tests of the presence of uncombined acids and alkalies; the former changing the blue colour to a red, the latter to a green. The infusion is not liable to change if it be kept in a tin flask, well stopped.

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[1] ιον πορφυροῦν Dioscoridis.

Officinal preparation. *Syrupus Violæ*. E. D.

VITIS. *Spec. Plant. Willd.* i. 1180.

Cl. 5. *Ord.* 1. Pentandria Monogynia. *Nat. ord.* Hederaceæ *Linn.* Vitis *Juss.*

G. 453. *Petals* cohering at the apex, shrivelling. *Berry* five-seeded; superior.

Species 1. V. *vinifera*. Common Vine. *Med. Bot. 2d edit.* 144. *t.* 57. *Duhamel Arb.* ii. *t.* 1—6.

Officinal. UVÆ PASSÆ. *Lond.* VITIS VINIFERÆ FRUCTUS. *Edin.* UVÆ PASSÆ SOLE SICCATÆ. *Dub.* Raisins, Sun Raisins.

Syn. Raisin secs (*F.*) Rosine (*G.*) Uva passa (*I.*) Passa (*S.*) Zabib (*Arab.*) Kishmish (*H.*)

The vine is a native of most of the temperate regions of the earth; and is cultivated with care wherever its fruit can be brought to perfection. Its culture is supposed to have been introduced from the East, where it was cultivated, and wine made from the fruit, in the earliest ages[1]; and afterwards to have extended from Italy to Burgundy in the time of the Antonines. In Great Britain the vine was cultivated before the year 731, when Bede finished his History; but although it was at one period brought to considerable perfection[2], yet, from the greater value of the ground for the cultivation of corn, and the wines produced in this country having never equalled those of the continent, vineyards are now scarcely known in Britain. The vine, therefore, is cultivated here for the dessert only, no raisins are made, and scarcely any wine.

The vine has a slender twisted climbing stem, covered with a rough peeling fibrous bark. The leaves are lobed, and sinuated, serrate, and placed alternately on long footstalks. The flowers, which appear in June and July, are small, and produced in clusters, attended by tendrils. The calyx is very minute; the petals are of a greenish white colour, adherent at their apices, and soon fall off, like a little cap, from the anthers, which then spread, and shed their pollen. The fruit is a succulent globular berry, one-celled when ripe; naturally containing five seeds; but in general only two, which are hard and of an irregular form. There are many varieties of the vine: that which is called the Alexandrian Frontiniac yields the most delicious grapes for eating, and the Syrian the largest bunches.[3]

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[1] We are told that Noah, after coming out of the ark, planted a vineyard, and "drank of the vine, and was drunken." *Genesis*, chap. ix. ver. 20, 21.

[2] There were many vineyards in different parts of this country from which wine was made; and we are informed, that in the cellar at Arundel castle, in 1763, there were sixty pipes of excellent Burgundy, the produce of a vineyard attached to the castle. *Museum Rusticum*, i. 85.

[3] This is supposed to be the sort of grape which the spies, sent by Moses to examine Canaan, cut down at the brook Eshcol; "a branch with one cluster of grapes, and

Raisins are made from the varieties named the *black raisin grape*, and the *white raisin grape*. They are cured in two methods: either by cutting the stalk of the bunches half through, when the grapes are nearly ripe, and leaving them suspended on the vine till their watery part is evaporated, and the sun dries and candies them; or by gathering the grapes when they are fully ripe, and dipping them in a ley made of the ashes of the burnt tendrils; after which they are exposed to the sun to dry. Those cured in the first method are most esteemed. They are brought to this country packed in boxes with sand.

Qualities. — *Grapes*, when recent and fully ripe, have an agreeable, cooling, sweet, subacid taste. They contain sugar, mucilage, and jelly, albumen, gluten [1], super-tartrate of potash, and tartaric, citric, and malic acids. *Raisins* differ from grapes chiefly in the quantity of saccharine matter being more abundant.

Medical properties and uses. — The ripe fruit of the vine is cooling and antiseptic; and when eaten in large quantities diuretic and laxative. Grapes are very useful in febrile diseases, particularly in bilious and putrid fevers, dysentery, and all inflammatory affections. In Syria the juice of ripe grapes inspissated is used in great quantity in these diseases. [2] Grapes have been strongly recommended as an article of common diet in phthisis [3]; and they certainly contain much bland nutritious matter, well fitted for phthisical habits. *Raisins* are more laxative than the fresh fruit, and are apt to prove flatulent when eaten in any considerable quantity. They are used as an adjunct to some officinal preparations; but add nothing to their efficacy.

VINUM. Wine.

Officinal. VINUM. *Vinum album Hispanicum.* Lond. VINUM ALBUM HISPANUM. *Edin.* Sherry Wine.

Syn. Vins d'Espagne (*F.*) Wein (*G.*) Vino (*I.*) Vino de Xerez (*S.*) Khumr (*Arab.*) Bāde (*Pers.*) Dakh ramudh (*H.*)

Although the London and Edinburgh Colleges have designated *Sherry* only, yet all the generous wines are occasionally

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they bare it between two upon a staff." *Numbers*, chap. xiii. 23. Strabo relates, that in Margiana bunches of grapes were produced two cubits, or a yard long; and in some of the Archipelago islands they weigh from thirty to forty pounds. The Syrian grape, in this country, has produced bunches weighing nineteen pounds and a half. *Martyn's edition of Miller's Dictionary.*

[1] The gluten excites the vinous fermentation in the juice of the grape when expressed. Fabroni has shown that it is lodged on the membranes that separate the cells of the grape; and become mixed with the saccharine part when the juice is expressed.

[2] *Russel's Natural History of Aleppo*, vol. i. p. 83.

[3] *Moore's View of Society, &c. in Italy*, ii. letter 62.

used as medicinal agents, and therefore we shall take a general view of the manufacture, characters, and properties of wine.

In the wine countries, when grapes are fully ripe they are gathered and immediately subjected to the press, by which the juice is separated from the skins and seeds. In some places the grapes are previously picked from the stalks, and freed from all the unsound ones with great care[1]: in some they are pressed just as they are gathered from the vines; and in other places they are almost converted into raisins before they are pressed.[2] The expressed juice is called *must*, and contains all the principles which we enumerated above as being contained in the grape: these, when the vats holding the *must* are placed in a temperature of 70°, begin to act upon each other, the liquor becomes turbid, an intestine motion is evident in it, its temperature increases, a scum collects on its surface, and carbonic acid gas is disengaged. This is the process of vinous fermentation. In a few days its activity gradually decreases, the scum and impurities subside to the bottom; and the liquor clears, having lost its saccharine taste, and become *wine.* It is then put into barrels, and in due time into bottles, in both of which kind of vessels the fermentation is continued, although in an imperceptible degree; nor is it altogether completed till the wine attains the utmost limits of its age, and passes into the acetous fermentation. All the principles of the *must* are perhaps required for the production of wine; but the saccharine matter, the gluten, and the vegetable acid, are essential; and on the proper quantity of the first in particular, and the manner in which the fermentation is conducted, depend the strength and goodness of the wine. When the sugar is in too great quantity, and not completely decomposed, or the fermentation checked, the wine retains a sweet taste; a more proper proportion and perfect decomposition, with a brisker fermentation, render it strong and spirituous; but if the quantity of sugar be small, and at the same time there is a deficiency of tartar in the *must*, a thin and weak wine is produced. When it is bottled early it becomes brisk and sparkling; and it is rough and astringent when the fermentation has been conducted on the skins, particularly on those of the coloured grapes; which also gives colour to the wine; for when the juice only is fermented, white wines are produced from coloured grapes.

Wine, that has been too long fermented before being put into the casks, is very apt to become sour; and frequently oxides of lead, as litharge, and white lead, are employed to correct the acidity. According to Fourcroy, these form a soluble triple salt, an aceto-tartrate of lead, by uniting with the acetic and tartaric acids in the wine[1]; which daily experience shows produces violent cholic, and other deleterious effects on those who drink it. The fraud may be detected by means of a solution of sulphuretted hydrogen gas, as has been already explained. (See *Plumbum.*)

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[1] This is the case at Madeira; and at Epernay, where the best Champagne is made.

[2] The wine of Chio, which was esteemed by the ancients for its strength, sweetness, and exquisite aromatic flavour, is made from nearly dried grapes.

Qualities.—Various circumstances, such as climate, soil, and the mode of conducting the fermentation, modify the flavour and taste of wine. The odour of *Sherry* is pleasant and aromatic; the taste warm, and slightly acidulous, with some degree of the agreeable bitterness of the peach kernel. The taste of *Port* is austere, and bitterish; *Claret* is less rough, thinner, and higher flavoured; *Hock* acidulous. Of the common white wines, *Marsala* is the strongest; *Malaga* the sweetest; and *Champagne* the most acidulous. The sparkling of *Champagne* is owing to carbonic acid gas, which it contains loosely combined. But notwithstanding these and other differences, the essential components of all wines are the following: One or more *acids*; generally the malic, but in some the carbonic predominates; and all contain some tartaric. *Extractive matter*, which in old wines is deposited with the tartar: A *volatile oil*, on which the flavor depends: *Colouring matter*; and *Alcohol*, the most important of their ingredients, and that one on which their dietetic and medical properties depend.[2] Mr. Brande has proved that this principle is ready formed in wine, and not, as Fabroni supposed, the result of its distillation. The following table shows the average quantity, by measure, of alcohol of the gravity 0·825, contained in different wines, according to Mr. Brande's experiments.—

		Proportion of spirit per cent. by measure.			*Proportion of spirit per cent. by measure.*
1	Lissa (average) -	25.41	12	Red Constantia -	18.92
2	Port (do.) - -	22.18	13	Lisbon - - - -	18.94
3	Raisin wine (do.)	25.12	14	Malaga (1666) -	18.94
4	Marsala (do.) -	25.9	15	Bucellas - - -	18.49
5	Madeira (do.) -	22.27	16	Red Madeira (aver.)	20.35
6	Currant wine - -	20.55	17	Cape Muschat -	18.25
7	Sherry (average) -	19.17	18	Cape Madeira (aver.)	20.51
8	Teneriffe - - -	19.79	19	Grape wine - -	18.11
9	Colares - - -	19.75	20	Calcavella (average)	18.65
10	Lachryma Christi	19.70	21	Vidonia - - -	19.25
11	White Constantia	19.75	22	Alba Flora - -	17.26

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[1] *Annales de Chimie*, vol. i. p. 76.

[2] Neuman examined various wines, and the results, which are given in a table, (see next page), are important as they show the relative portions of spirit each wine contains.

		Proportion of spirit per cent. by measure.
23	Malaga - - -	17.26
24	White Hermitage	17.43
25	Rousillon (average)	18.13
26	Claret (do.) - -	15.10
27	Malmsey Madeira	16.40
28	Lunel - - - - -	15.52
29	Sheraaz - - -	15.52
30	Syracuse - - -	15.28
31	Sauterne - - -	14.22
32	Burgundy (average)	14.57
33	Hock (do.) - -	13.68
34	Hock (old in cask)	8.88
35	Nice - - - -	14.63
36	Barsac - - - -	13.86
37	Tent - - - -	13.30
38	Champagne, white	13.30
39	Champagne, red -	11.93
40	Red Hermitage -	12.32
41	Vin de Grave (aver.)	13.37
42	Frontignac - -	12.79
43	Cote Rotie - -	12.32
44	Gooseberry wine	11.84
45	Tokay - - -	9.88
46	Elder wine - -	9.87
47	Orange wine, average of 6 samples, made by a London manufacturer - -	11.26
48	Cyder (highest aver.)	9.87
	Do. (lowest do.) -	5.21
49	Perry (aver. of 4 samples) - - -	7.26
50	Mead - - - -	[1] 7.32

TABLE referred to in the preceding page.

A Quart of	Contains of											
	highly rectified Spirit.		*thick, oily, uncluous, resinous Matter.*			*gummy & tartareous Matter.*			*Water.*			
	℥.	ʒ.	℥.	ʒ.	grs.	℥.	ʒ.	grs.	℔.	℥.	ʒ.	grs.
Aland - - -	1	6	3	2	0	1	5	0	2	5	3	0
Alicant - -	3	6	6	0	20	0	1	40	2	2	6	0
Burgundy - -	2	2	0	4	0	0	1	40	2	9	0	20
Carcassone - -	2	6	0	4	10	0	1	20	2	8	4	30
Champagne -	2	5	0	6	40	0	1	0	2	8	3	0
French - - -	3	0	0	6	40	0	1	0	2	8	0	20
Frontignac - -	3	0	3	4	0	0	5	20	2	4	6	30
Vin Grave - -	2	0	0	6	0	0	2	0	2	9	0	0
Hermitage - -	2	7	1	2	0	0	1	40	2	7	5	20
Madeira - - -	2	3	3	2	0	2	0	0	2	4	3	0
Malmsey - -	4	0	4	3	0	2	3	0	2	1	2	0
Vinode Monte Pulciano -	2	6	0	3	0	0	2	40	2	8	0	20
Moselle - -	2	2	0	4	20	0	1	30	2	9	0	10
Muscadine - -	3	0	2	4	0	1	0	0	2	5	4	0
Neufchatel - -	3	2	4	0	0	1	7	0	2	2	7	0
Palmsec - - -	2	3	2	4	0	4	4	0	2	2	5	0
Pontac - - -	2	0	0	5	20	0	2	0	2	9	0	40
Old Rhenish -	2	0	1	0	0	0	2	20	2	8	5	40
Rhenish - -	2	2	0	3	20	0	1	34	2	9	1	6
Salamanca - -	3	0	3	4	0	2	0	0	2	3	4	0
Sherry - - -	3	0	6	0	0	2	2	0	2	0	6	0
Spanish - - -	1	2	2	4	0	9	4	0	1	10	6	0
Vino Tinto - -	3	0	6	4	0	1	6	0	2	0	6	0
Tokay - - -	2	2	4	3	0	5	0	0	2	0	3	0
Tyrol, red - -	1	4	1	2	0	0	4	0	2	8	6	0
Red wine - -	1	6	0	4	40	0	2	20	2	9	3	30
White - - -	2	0	0	7	0	0	3	0	2	7	0	0

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[1] *Journ. of Science and the Arts*, vol. iv. p. 289. On the same principle Mr. Brande

Medical properties and uses. — Wine when good, and of a proper age, is cordial and tonic; but when new it is flatulent, debilitating, and purgative, and intoxicates sooner than old wine. In a dietetical point of view, the temperate use of it promotes digestion, and gives additional energy to the action of the heart and arteries, strengthens the animal functions, exhilarates the spirits, sharpens the wit, and calls into action all the intellectual powers: but when taken in excess, it intoxicates, producing sickness, head-ach, vertigo, and diarrhœa, with nervous tremors, which continue for two or three days; and, like ardent spirit, its habitual excessive use extinguishes the faculties of both body and mind, producing dyspepsia, emaciation, and debility, hepatic and pulmonary inflammation, palsy, gout, dropsy, and a long train of diseases and wretchedness.

As a remedy, wine is stimulant, antiseptic, tonic, and antispasmodic. Its stimulating properties are less diffusible, but more permanent than alcohol; and hence its dose is more easily regulated, and its effects are more certain. In all diseases accompanied with much debility, as typhoid fevers, and in cases of extensive ulceration or gangrene, wine is not only the best addition to cinchona bark and opium, but is a remedy on which alone there is much reliance; in some convulsive affections, as symptomatic tetanus, and chorea, much benefit has been derived from its use; and in the convalescencies from all severe diseases it is the most efficacious and the quickest mean we can employ for restoring the exhausted strength and vigour. Wine operates less powerfully on the system in a state of disease than in health: the quantity, however, to be given, and the proper period of exhibiting it, require to be regulated with much judgment. The skin being open, and not dry or hot, the strength sinking, and the ulcerations, if any exist, assuming a gangrenous appearance, indicate the use of wine: and when, in the event of the pulse being low and fluttering, wine restores its firmness without increasing delirium, and induces sleep, it may be given with a confidence of the greatest benefit. But if on the contrary it renders the pulse quicker, increases heat, thirst, delirium, or watchfulness, its exhibition ought immediately to be discontinued. The quantity to be given depends entirely on the nature of the disease, and the intentions for which it is administered. In typhus the proper rule is to give it till the pulse fills, the delirium abates, and the extremities warm; and it should be repeated on the smallest appearance of stupor,

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has stated the following as the proportion of spirit contained in malt liquor. Burton ale 8·88; Edinburgh ale 6·20; Dorchester ale 5·56; Brown stout 6·80; London porter (average) 4·20; London small beer (average) 1·28.

quick and sinking pulse, or tremor.[1] A few glasses, and these even diluted with water, given in the space of twenty-four hours, will often produce all that is required from wine: but sometimes very large quantities are necessary. In a case of symptomatic tetanus, mentioned by Currie[2], five bottles of Madeira wine were taken every day for some time, without producing the least symptoms of ebriety, or morbidly exciting the pulse; but on the contrary, with the utmost advantage in allaying irritation, and relieving the patient. In ordinary cases of fevers, however, wine is, perhaps, in general too freely given, so as to occasion exhaustion instead of supporting strength.

ULMUS. *Spec. Plant. Willd.* i. 1324.

Cl. 5. *Ord.* 2. Pentandria Digynia. *Nat. ord.* Scabridæ *Linn.* Amentaceæ *Juss.*

G. 505. *Calyx* five-cleft. *Corolla* none. *Capsule* (*samara*) compressed, membranaceous.

Species 1. U. *campestris.*[3] Common Elm. *Med. Bot. 2d edit.* 710. *t.* 242. *Smith Flora Brit.* i. 281.

Officinal. ULMI CORTEX. *Lond.* ULMI CAMPESTRIS CORTEX. *Edin.* ULMUS; CORTEX INTERIOR. *Dub.* Elm bark.

Syn. Orme (*F.*) Ulmrinde (*G.*) Olmo (*I.*) Olmo (*S.*)

The elm-tree is indigenous, and very abundantly cultivated, flowering early in April, before the leaves are unfolded. It grows to a considerable height, sending off strong, spreading, lateral branches; with the bark of the trunk very rough and cracked, but that of the younger branches smooth and tough. The leaves are rough on both sides, villose beneath along the veins, serrate, longer on one side of the midrib than on the other, about three inches long, two broad, and of a dark-green colour. The flowers are in distinct gems, clustered, scarcely peduncled, numerous, small, of a brownish flesh colour, and have a violet odour. The capsules are oblong.

The inner part of the bark of the younger branches, which is of a yellowish colour, is the part officinally used, and is sold freed from the epidermis.

Qualities.— Elm-bark is inodorous, and has a slightly bitter slimy taste. When boiled in a small quantity of water it forms a thick dark-brown coloured decoction, which gelatinizes as it cools; and when evaporated leaves a brittle semi-transparent substance, soluble in water, but insoluble in alcohol and ether, to which, however, it imparts a brownish colour. The brittle residue, when treated in the same manner as Klaproth treated the gum-like exudation from the *Ulmus nigra*, afforded nearly the same results[1]; but from the effects of some re-agents (see *Decoction,*) I am inclined to regard it as a peculiar modification of mucus, combined with extractive, gallic acid[2], and supertartrate of potash, which Scheele detected in elm-bark.

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[1] *Moore's Medical Sketches.*

[2] *Reports on Water*, i. 174.

[3] Πτελεα Græcorum.

Medical properties and uses. — This bark operates as a diuretic. It has been given with seeming benefit in herpetic eruptions; and Dr. Lettsom[3] attributes the cure of a severe case of lepra ichthyosis, in which other remedies failed, to the use of this bark. Other practitioners have also related cases of its efficacy; but Dr. Willan[4] thinks it is of little use. It is generally given in the form of decoction.

Officinal preparation. *Decoctum Ulmi.* L. D.

UVÆ PASSÆ. Vide *Vitis.*

UVÆ URSI FOLIA. Vide *Arbutus.*

WINTERA. *Spec. Plant. Willd.* ii. 1239.

Cl. 13. *Ord.* 4. Polyandria Tetragynia. *Nat. Ord.* Magnoliæ *Juss.*

G. 1063. *Calyx* three-lobed. *Petals* six or twelve. *Germens* club-shaped. *Style* none. *Berries* four or eight, obovate.

Species 1. W. *aromatica.* Winter's Bark-tree. *Med. Bot. 2d edit.* 647. *t.* 226. *Phil. Trans.* xvii. 923. *t.* 1. *f.* 1, 2.

Officinal. WINTERÆ AROMATICÆ CORTEX. *Edin.* Winter's Bark.

Syn. Cannelles de Winter (*F.*) Winterana (*I.*)

The tree is a native of the Straits of Magellan, growing in valleys which are exposed to the sun. It is a large ever-green tree; covered on the trunk with a grey wrinkled bark, which on the branches is green and smooth. The leaves are petiolate, elliptical, obtuse, smooth, an inch and a half in length, an inch broad in the middle, and of a light-green colour. The flowers are axillary, two, three, or more together, on short peduncles of a milk white colour, with the odour of jasmine; the petals are unequal, oval, obtuse, concave, and erect; the filaments shorter than the petals, supporting large, oval anthers, and the germens turbinated, with sessile, divided, flat stigmas. The berries are of a light-green colour spotted with black, and contain several black aromatic seeds.

This tree was discovered in 1577, by captain Winter, the crew of whose ship used the bark as spice. It is not often found in the shops; and is frequently confounded with the canella alba, from which it may be distinguished by being in larger pieces, and having more of a cinnamon hue.

Qualities.—Winter's bark has an aromatic odour; and a pungent hot spicy taste, slowly imparted but very permanent. These qualities depend on a volatile oil, which can be obtained separate, in distillation with water.

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[1] *Thomson's Chemistry,* 4th ed. iv. 695.

[2] Very little tannin is present, as it scarcely effects a solution of gelatine.

[3] *Medical Memoirs,* 152.

[4] *Description,* &c. *of Cutaneous Diseases,* i. 139.

Medical properties and uses. — This bark is stomachic and carminative. It has been found efficacious in scurvy, and may be used as an adjunct to simple bitters in dyspepsia; but it does not appear to be superior to canella alba, and is very little used.

ZINCUM. Zinc.

Syn. Zinc (*F.*) Zink (*G.*) Zinco (*I.*) Tootanāgum (*Tam.*)

Zinc is a semiductile metal procured in great abundance in Britain, particularly in Derbyshire; and in most of the mining countries of Europe. It occurs in

A. The metallic state:
i. combined with sulphur and iron. Sp. 1. *Blende.*
Var. *a.* Yellow blende.
b. Brown blende.
c. Black blende.
B. Oxidized:
ii. combined with silica. 2. *Red Zinc ore.*
iii. acidified by carbonic acid. 3. *Electric calamine.*
4. *Common calamine.*
Var. *a.* crystallized.
b. compact.
c. earthy.

As the fourth species of these ores is an article of the materia medica, we shall describe its characters and properties before we notice those of metallic zinc.

1. COMMON CALAMINE.

Officinal. CALAMINA. *Carbonas Zinci impura.* Lond. CARBONAS ZINCI IMPURUS. *Edin.* CALAMINARIS. *Dub.* Calamine. Impure Carbonate of Zinc.

Syn. Pierre Calaminaire (*F.*) Galmey (*G.*) Pietra Calaminare (*I.*) Calamina (*S.*) Madal tootum (*Tam.*)

This ore of zinc is found abundantly in Derbyshire, Somersetshire, Cumberland, and Flintshire, occurring in veins in secondary limestone, generally accompanied by galena, calcareous spar, quartz, and other ores of zinc. The three varieties are indiscriminately used; and consist, according to an analysis by Mr. Smithson[1], of the following components: *var. a.* 65·2 oxide of zinc, 34·8 carbonic acid; *var. b.* 64·8 oxide of zinc, 35·2 carbonic acid; *var. c.* 71·4 oxide of zinc, 13·5 carbonic acid, 15·1 water, — in 100 parts of each variety. They are, however, generally calcined in a moderate heat, by which part of their carbonic acid is dissipated, before they are brought to the shops.

Qualities. — Calamine is usually in the form of grayish yellow or reddish yellow friable lumps, without lustre, opaque, and breaking with an irregular earthy fracture. The specific gravity of the two first varieties is 4·334; that of the last 3·584. Before the blowpipe calamine becomes yellow; and when exposed to its utmost heat is sublimed. It dissolves in sulphuric acid with effervescence, but does not gelatinize. It is not used as a remedy till after it is prepared.

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[1] *Phil. Trans.* 1803. 17.

Officinal preparation. *Calamina preparata.* L. E. D.

2. METALLIC ZINC.

Officinal. ZINCUM. *Lond. Edin. Dub.* Zinc.

Although the method of extracting zinc from its ores had been long known and practised in India and China, yet it was not known in Europe till about 1742, when Von Swab first obtained it by distillation. At present it is well understood, and conducted in the following manner: — The sulphuret or blende, which is the ore usually employed, is first broken to pieces, and the galena and pyrites separated by hand; and is then roasted in a reverberatory furnace, by which the carbonic acid and part of the sulphur are driven off. The roasted ore being washed, to separate the metallic particles from the lighter parts, is now ground in a mill with one-eighth of its weight of charcoal; and put into large earthen jars placed in a circular furnace, and through the bottom of each of which passes an iron tube that goes through the floor of the furnace into a vessel of water placed beneath. The cover of each jar is firmly and accurately luted on, so that the reduced zinc, as it is elevated by the strong heat of the furnace, not finding a vent to escape by the top, descends through the iron tube into the water, and is there condensed in small metallic drops, that are afterwards melted and cast into ingots, in which state it is brought to market[1], under the name of *speltre.*

Qualities. — Zinc when rubbed between the fingers emits a very perceptible odour and has a peculiar taste. Its colour is brilliant white with a shade of blue; its fracture shining and lamellated; hard, yet staining the fingers black when rubbed upon them. Its specific gravity varies from 6·861 to 7·1. In any temperature between 212° to 400° it is very malleable; but at a higher temperature it can be pulverized in a mortar. It may be drawn into wire, but its ductility is not great. Zinc melts at 680° of Fahrenheit; if in contact with air it is rapidly oxidized; and at the temperature of ignition burns with a white dazzling flame, and is volatilized in the state of a flocculent white oxide. It is oxidized and soluble in all the acids; and decomposes water when aided by a small portion of sulphuric or of muriatic acid. It is used only for pharmaceutical purposes.

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[1] The principal works are near Bristol, and at Swansea.

Officinal preparations. *Zinci Oxydum.* L. E. D. *Zinci Sulphas.* L. E. D.

3. IMPURE OXIDE OF ZINC.

Officinal. OXIDUM ZINCI IMPURUM. *Edin.* TUTIA. *Dub.* Impure Oxide of Zinc. Tutty.

Syn. Tutie (*F.*) Tutia (*G.*) Tuzia (*I.*) Atutia (*S.*)

This substance is supposed to be an artificial compound of the sublimed oxide of zinc that collects in the chimneys of the furnaces in which the ores of this metal are roasted, mixed with clay and water, and baked.

Qualities. — Tutty is inodorous and insipid, of a brownish colour on the outside, moderately hard and ponderous, and breaks with a smooth fracture. The internal colour is yellowish; and the pieces sometimes contain small globules of zinc. The oxide it contains consists of 85 zinc, 15 oxygen, — in 100 parts. It is not employed as a remedy until it is levigated and prepared.

Officinal preparations. *Oxidum Zinci impurum preparatum.* E. *Unguentum Oxidi Zinci impuri.* E. D.

ZINGIBER. *Trans. Linn. Society,* viii. 347.

Cl. 1. *Ord.* 1. Monandria Monogynia. *Nat. ord.* Scitamineæ *Linn.* Cannæ *Juss.*

G. *novum.* *Anther* double. *Filament* lengthened beyond the anther with a furrowed awl-shaped apex. *Style* received in the furrow of the anther.

Sp. 1. Z. *officinale.*[1] Officinal Ginger. *Jacquin Hortus Vindobonensis,* i. 31. t. 75. (Amomum *Zingiber*) *Willd. Spec. Plant.* i. 6. *Med. Bot. 2d edit.* 731. *t.* 250. *Rumph. Amb.* ii. *t.* 12.

Officinal. ZINGIBERIS RADIX. *Lond.* AMOMI ZINGIBERIS RADIX. *Edin.* ZINGIBER; RADIX CONDITA. *Dub.* Ginger root dried and preserved.

Syn. Gingembre (*F.*) Ingwer; Imber (*G.*) Zenzero (*I.*) Gengibre (*S.*) Sont'h (*H.*) Sunt'hi (*San.*)

The ginger plant is a native of the East Indies[2], and is particularly abundant in the mountainous district of *Gingi*, to the east of Pondicherry, whence it derived its name. It is now naturalized to the West Indies, where it flowers in September. The root is perennial, creeping, of a compressed roundish form, or tuberose, fleshy, and sending off many long fibres and offsets: the stem is annual, rises about three feet in height, is an annual culm, solid, upright, round, and enclosed in an imbricate membranous sheathing: the leaves are alternate, linear-lanceolate, six inches long, smooth, and on short embracing petioles: the flowers are in a dense spike close to the stem, composed of

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[1] *Ζιγγιϐερις* Dioscoridis. The similarity between the Greek name of the plant, and the Sanscrit Śrĭngavera (horn-shaped) is remarkable. *Asiatic Researches*, vol. xi. p. 346.

[2] It is named *alè* by the Brahmins.

large upright, ovate, subacuminate, coloured scales, half closing the flowers: the calyx is a small double spathe of a dingy yellow colour, tubular, with the segments of the border conical, and nearly equal: the anther-bearing filament is extended beyond the anther, has an awl-shaped appendage with a groove to receive the style after it has passed between the lobes of the anthers, and is terminated with the stigma a little beyond the extremity of the filament: the capsule is smooth, containing many oblong seeds.

The herbaceous part of the plant withers in December, and the roots are dug up in January; but when the root is intended to be preserved in syrup, it is dug up when the shoots do not exceed five or six inches in height. For preparing the dried ginger, after the roots are dug, the best pieces are selected, scraped, then washed, and dried in the sun with great care. This is called *white ginger*; in contradistinction to which the roots that are scalded in boiling water before being dried are denominated *black ginger*. The confected or preserved ginger is prepared by scalding the green roots till they are tender; then peeling them in cold water, and putting them into a thin syrup, from which in a few days they are shifted into the jars in which they come home, and a very rich syrup poured over them.

Dried ginger is imported in bags, each containing about one hundred weight. The white kind brings the highest price, being more pungent and better flavoured. The external characters of goodness in either are soundness, or the being free from worm holes; heaviness, and firmness: the pieces that are light and soft, or very friable and fibrous, should be rejected. The confected ginger is nearly translucent when good.

Qualities.—Dried ginger has a pungent aromatic odour, and a hot biting taste. Its odour appears to depend on a volatile oil, which can be obtained separate in distillation with water, and has all the flavour but none of the pungency of the root. Water, alcohol, and ether extract its virtues. The greater part of ginger root, however, is starch. To separate it, triturate the root with water, and strain through cloths; then after the fecula suspended in the water has subsided, separate it by decanting off the water, and macerate in alcohol; what remains undissolved is a tolerably pure insipid starch. The pungency resides in a resino-extractive matter, which is combined with the fecula, but may be obtained separate by evaporating the ethereal tincture on the surface of water.

Medical properties and uses.—Ginger is stimulant, carminative, and sialogogue. It has been found useful in flatulent cholic, dyspepsia, and tympanitis; and in gout when it attacks the stomach. It is less frequently used alone than as an adjunct to other remedies to promote their efficacy, and give them warmth. The local stimulus of ginger when chewed excites the salivary glands, and provokes a considerable flow of saliva: hence it has been found useful as a sialogogue in relaxations of the uvula and tonsils, and in paralysis of the muscles of the tongue and fauces.

The dose of powdered ginger may be from grs. x. to ℈j.

Officinal preparations. *Syrupus Zingiberis*, L. E. D. *Tinctura Zingiberis*. L. D.

PART III.

PREPARATIONS AND COMPOUNDS.

ACIDS.

THESE are substances which have a sour taste: and are capable of combining with alkalis, earths, and metallic oxides, while at the same time they lose their acidity, and form compounds named neutral salts, in which the properties of the acid, the alkali, the earth, or the oxide employed, are lost. They change to red, the blue, purple, and green colours of vegetables; and unite with water in almost every proportion. These circumstances, therefore, may be regarded as characteristic of this class of substances.

Acids are supposed to be combustible bodies combined with oxygen, which is regarded as the principle of acidity from which they derive their properties; but although it is questionable, whether there is any acid that does not contain oxygen as an essential component, yet it is by no means true that the combination of every combustible with oxygen will constitute an acid. Thus the combination of hydrogen with oxygen forms water which is not acid; and it is now known that the alkalis owe their alkaline properties to the presence of oxygen, as much as the acids owe to it their acid properties.[1] For the formation of an acid, therefore, by the union of any body with oxygen, some principle must be previously present in the body, common, in a greater or less degree, to all bodies capable of being formed into acids, which may be regarded as the principle of acidity, although it be yet unknown.

On the supposition that all acids are compounds of oxygen with certain bases, the name of each is derived from the base of which it is formed; thus, from sulphur comes sulphuric acid: but the same base being capable of uniting with different proportions of oxygen, the terminations *ous* and *ic* are added to indicate the degree of acidification: thus when sulphur is united with the smaller proportion of oxygen, the acid produced is named sulphurous acid; when with the full proportion, sulphuric acid. One or two acids are moreover supposed to combine with a still larger proportion of oxygen, to denote which the syllable *oxy* (for oxygenized) is prefixed:

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[1] See Davy's Discoveries, *Phil. Trans.* 1808.

thus muriatic acid supposed to be combined with an excess of oxygen becomes oxymuriatic acid.

The stronger acids require to be kept in glass bottles, furnished with well ground glass stoppers, and having the name of the acid which each contains engraved on the glass. They should be dispensed also in glass stopped phials. The acids known to chemists are very numerous; but of these a small proportion only is employed for medical and pharmaceutical purposes. In the London Pharmacopœia, the arrangement of which we have adopted, they are placed in alphabetical order; but in this place it may be proper first to exhibit them according to the nature of their radicals or bases.

I. ACIDS WITH SIMPLE RADICALS.

SULPHUR	1. SULPHURIC ACID.
NITROGEN	2. NITROUS ACID. 3. NITRIC ACID.

II. ACIDS WITH DOUBLE RADICALS.

CARBON AND HYDROGEN	4. ACETIC ACID. 5. CITRIC ACID. 6. BENZOIC ACID. 7. SUCCINIC ACID.

III. ACIDS WITH UNKNOWN RADICALS.

8. MURIATIC ACID.
9. OXYMURIATIC ACID.

ACIDUM ACETICUM. Lond.[1] *Acetic Acid.*

"Take of vinegar, *a gallon;* distil the acetic acid from a glass retort, placed in a sand bath, into a glass receiver kept cool: throw away the first pint, and preserve the six succeeding pints which are distilled."

ACIDUM ACETICUM TENUE. Edin. *Weak Acetic Acid.*

"Distil eight pounds of vinegar in glass vessels, with a gentle heat. The pound which first comes over, being too watery, is to be rejected; the five pounds that follow, will be the weak acetic acid. The distillation may be continued as long as a colourless acid comes over; but, this being too much burnt, and unfit for internal use, may be mixed with the pound which first came over, and preserved for various chemical uses."

ACETUM DISTILLATUM. Dub. *Distilled Vinegar.*

"Take of wine vinegar, *ten pints;* distil with a gentle heat *six pints.* The distillation must be performed in a glass vessel, and the first pound which comes over rejected."

The specific gravity of this acid is to that of water as 1006 to 1000.

Of the three appellations given to this preparation in the British pharmacopœias, that of the Edinburgh College only is unobjectionable. It is the acetic acid in a more diluted state than that in which it exists in vinegar, but purer; being freed in a great degree from the mucilage, extractive, supertartrate of potash, and other extraneous matters which vinegar contains.[1] The distillation on a large scale is often conducted in the common copper still, or in a tinned still with a pewter worm; but both these practices, as they are apt to give dangerous metallic impregnations to the product, are highly reprehensible, when the distilled vinegar is to be employed for medicinal purposes.

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[1] Vinaigre distillé (*F.*) Distillirter Essig (*G.*) Aceto distillato (*I.*) Vinaigre distilado (*S.*)

In performing the process, it is more important to avoid carrying the distillation too far, than to reject the first eighth part which comes over; for although this is undoubtedly weaker, and contains a small portion of alcohol, yet it retains about one-twelfth[2] of the whole quantity of the real acid obtained: but by continuing the process a little too long, the whole product acquires an unpleasant empyreumatic flavour. This is avoided by changing the receiver rather before the quantity ordered has been obtained; and if to the residue be added an equal quantity of hot water and half an ounce of recently burnt animal charcoal[3], for every pint of fluid in the retort, the distillation may be recommenced, and an additional portion of the diluted acid obtained, equally pure and strong as the former. At the end of the operation, when dilution has not been employed, the residue is a deep red coloured liquor, strongly acid, very empyreumatic, and which deposits supertartrate of potash.

Qualities.—Distilled vinegar has a fainter and less agreeable odour than common vinegar; a grateful, not strong, acid taste; is limpid and colourless; and of a specific gravity varying from 1·007 to 1·0023. One fluid ounce of spec. grav. 1·007 should dissolve 13·8 grains of marble. It dissolves the gum resins and the acrid principles of plants, such as the squill and meadow saffron; and forms acetates with the alkalies and several of the metallic oxides. Darracq[4] ascertained that it differs from acetic acid in containing some uncombined mucilage and extractive matter, but that the acids are otherwise the same. It is owing to this extractive that, when distilled vinegar is boiled with potash, the solution has a deep reddish brown colour, and during evaporation carbonaceous matter is deposited. It is sometimes adulterated. Sulphuric acid is detected by a precipitate being produced on the addition of a solution of acetate of barytes; lead and tin, by a solution of sulphuretted hydrogen, forming a dark-coloured precipitate; and copper, by the acid assuming a blue colour, when supersaturated with ammonia.

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[1] See *Acetum*, Part II.

[2] *London Medical Review*, No. x. 125.

[3] Animal charcoal is made by calcining bones in a crucible, to which is luted a perforated cover. When no more flame issues from the aperture, it must be closed, and the heat raised for half an hour.

[4] *Annales de Chimie*, xli. 264.

Medical properties and uses.—The same as those of common vinegar; but, as it is purer, and not liable to spontaneous decomposition, it is fitter for pharmaceutical purposes.

Officinal preparations. *Liquor Ammoniæ Acetatis.* L. E. D. *Potassæ Acetas.* L. E. D. *Acetas Ferri.* D. *Liquor Plumbi Subacetatis.* L. D. *Plumbi Superacetas.* L. E. D. *Acetum Colchici.* L. *Acetum Scillæ.* L. E. D. *Oxymel.* L. D. *Emplastrum Ammoniaci.* L. *Oxymel Colchici.* D.

ACIDUM ACETICUM. Dub.[1] *Acetic Acid.*

"Take of acetate of kali, (potash), *six ounces;* sulphuric acid, *three ounces by weight.* Pour the acid into a tubulated retort: then add to it in small portions and at different times, the acetate of potash, allowing the mixture to cool after each addition: finally, with a moderate heat, distil the acid until the residue be dry.

"The specific gravity of this acid is to that of distilled water, as 1070 to 1000."

ACIDUM ACETICUM FORTE. Edin. *Strong acetic Acid.*

"Take of dried sulphate of iron, *one pound;* acetate (*superacetate*) of lead, *ten ounces.* Rub them together; then put them into a retort, and distil in a sand bath with a moderate heat, as long as any acid comes over."

These processes furnish the same acid as that which is contained in distilled vinegar, but completely freed from extractive and mucilage, and much stronger. In the process of the Dublin College, the sulphuric acid, by reason of its superior affinity for potash, decomposes the acetate of potash, and sets free the acetic acid; which must necessarily come over in a concentrated form, as the acetate does not contain much water, and the greater part of the water of the sulphuric acid is retained by the sulphate of potash which is formed in the retort. The Edinburgh process is that of Badollier, an apothecary of Chartres[2], with the substitution of sulphate of iron for sulphate of copper. The affinity of the sulphuric acid of the sulphate of iron to the oxide of the acetate of lead, assisted by the heat, decomposes the acetate, and the sulphuric acid uniting with the lead, the acetic acid is disengaged, and distils over. The dried state of the salts enables the acid to be in a concentrated form.[3] The process of the Dublin College is the best; the acid obtained being stronger, not contaminated with any metallic impregnation, and free from sulphurous acid, a small portion of which the other generally contains.[1]

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[1] Acide Acetique (*F.*) Essigsäure (*G.*) Acido acetico (*I.*)

[2] *Annales de Chimie,* xxxvii. 3.

[3] The process of the edition of the London Pharmacopœia of 1787, for obtaining this acid by the simple distillation of dried subacetate of copper, afforded a much stronger acid than either of these processes. An excellent acetic acid is obtained by decomposing the superacetate of lead at once, by means of sulphuric acid; putting into the retort, before distilling, a small portion of oxide of manganese, as directed by M. Baup. Vide *Journ. de Pharm.* Dec. 1816.

Qualities.—Acetic acid has a grateful, fragrant, pungent odour; a very sour acrid taste; and, when applied to the skin inflames it and raises a blister. It is limpid, colourless, highly volatile, and if much concentrated, takes fire when heated in the open air. It becomes solid and crystallizes at 38° of Fahrenheit, liquefying again at 40°; is capable of oxidizing iron, zinc, copper, nickel, and tin; combines with alkalies, earths, and metallic oxides, forming acetates; dissolves resins, gum-resins, camphor, and volatile oils; and combines with alcohol, which, when aided by heat, it converts into a species of ether. With water it unites in any proportion, and during the mixture heat is evolved. From the experiments of Guy Lussac 100 parts of pure acetic acid appear to consist of 50·224 of carbon, 5·629 of hydrogen, and 44·147 of oxygen.

Medical properties and uses.—Acetic acid is stimulant and rubefacient. It is principally employed as a refreshing scent, in syncope, asphyxia, and nervous head-achs; and for obviating the unpleasant smell of the confined air of crowded assemblies and of the sick-room. It is, also, a useful application to warts and corns, which it seldom fails to remove; but in applying it care must be taken to avoid the surrounding skin.

Officinal preparation. *Acidum acetosum camphoratum.* E. D.

ACIDUM BENZOICUM. Lond.[2] *Benzoic Acid.*

"Take of benzoin, *a pound and a half;* lime fresh burnt, *four ounces;* water, *a gallon and a half;* muriatic acid, *four fluid ounces.* Rub the benzoin with the lime; then boil them in a gallon of water for half an hour, constantly stirring with a spatula, and pour off the liquor when it is cold. Boil what remains in four pints of water, and pour off the liquor as before. Afterwards mix the liquors together, and boil them to one half; then filter them through paper, and gradually drop in the muriatic acid until no more precipitation takes place. Finally, having poured off the liquor, dry the powder in a gentle heat; then put it into a proper vessel placed in a sand-bath; and with a moderate fire sublime the benzoic acid."

Edinburgh.

"Take of benzoin, *twenty-four ounces;* subcarbonate of soda, *eight ounces;* water, *sixteen pounds.* Triturate the balsam with the subcarbonate; then boil them in the water for half an hour, stirring them constantly, and strain. Boil the residue of the balsam in other six pounds of water, and strain. Mix the strained liquors, and evaporate to two pounds; filter again, and drop in diluted sulphuric acid as long as any precipitation is produced.

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[1] It may be completely freed from this acid by redistilling it from black oxide of manganese mixed with a small portion of carbonate of potash. *Nicholson's Journal,* xiii. 42.

[2] Acide Benzoïque (*F.*) Benzoesäure (*G.*) Acido Benzoico (*I.*)

"Dissolve the precipitated benzoic acid in boiling water: strain the liquor whilst it is hot through linen, and set it aside to crystallize. Wash the collected crystals with cold water; then dry, and preserve them for use."

Dublin.

"Take of benzoin, *any quantity.* Liquefy it in a wide-necked retort, to which a receiver is adapted but not luted, and sublime. The sublimed matter must be now and then removed from the tube of the retort, lest it accumulate in too great quantity. If it be soiled with oil, press it between folds of blotting paper to separate the oil, and repeat the sublimation."

The process of the Dublin College is the method recommended by Chaptal of separating the acid which the benzoin contains: but although the quantity contained be greater, yet if the fire be not very nicely regulated, a portion of empyreumatic oil is also volatilized, which gives the acid a brown tinge, and cannot easily be entirely separated from it.[1] The London process is in principle the same as that which Scheele published in 1775.[2] Lime separates the benzoic acid from the resin with which it is united in the balsam, combines with it, and forms a benzoate which is dissolved in the water; whilst at the same time a small portion of resin is also dissolved, and gives the solution a yellow colour. This benzoate is decomposed in its turn by the muriatic acid, which combines with the lime, and forms a soluble muriate; whilst the benzoic acid that is set free, being insoluble in cold water, precipitates in the form of a brownish powder. The subsequent sublimation frees the acid of this colour, and gives it the crystallized form and brilliant appearance of the acid originally obtained by sublimation, without any adhering oil. The Edinburgh process is a modification of this one, introduced by Gren, on the supposition that it is more œconomical, the sulphuric acid being cheaper than the muriatic acid.[3] The following are the quantities of acid obtained from one pound of benzoin by these processes, according to Mr. Brande's experiments.[4]

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[1] This acid was originally obtained by sublimation. It was described under the name of *flowers of benzoin* by Blaise de Vigeneve, in 1608. *Thomson's Chemistry,* 4th ed. ii. 289.

[2] *Scheele,* i. 124.

[3] Mr. Hatchett has proposed a simpler process than any of the above. He digests the benzoin in sulphuric acid; during which the benzoic acid is sublimed in great quantity very pure, and beautifully crystallized. *Phil. Trans.* 1805.

[4] *Nicholson's Journal,* x. 88.

	℥.	ʒ.	℈.	grs.
By Chaptal's (*that of the Dublin College*)	2	0	0	0
Scheele's (*the London*)	1	6	2	19
Gren's (*the Edinburgh*)	1	5	1	10

Benzoic acid may also be extracted from the other balsams.

Qualities. — Benzoic acid is, when perfectly pure, inodorous; but as it is usually found in the shops, it has a slight aromatic odour[1]: its taste is pungent, acrid and acidulous. It is in very minute acicular crystals and flakes, soft to the touch and not pulverulent, of a beautiful whiteness, and a silky lustre. Its specific gravity is 0·667. When heated, it melts, emits a suffocating, acrid, vapour and in a strong heat burns with a white flame. Benzoic acid is soluble in twenty-four times its weight of boiling water, and more abundantly in alcohol; but the water lets fall nineteen-twentieths in cooling. With the alkalies, earths, and metallic oxides, it forms benzoates, which are not used in medicine. According to Berzelius it is a triple compound of 74·41 of carbon, 5·16 of hydrogen, and 20·43 of oxygen.

Medical properties and uses. — This acid is stimulant; but, although it is retained by all the pharmacopœias, it is of little value as a remedy.

Officinal preparations. *Tinctura Camphoræ composita.* L. D. *Tinctura Opii ammoniata.* E.

ACIDUM CITRICUM. Lond.[2] *Citric Acid.*

"Take of lemon juice *a pint*; prepared chalk, *an ounce*, or a quantity sufficient to saturate the juice; diluted sulphuric acid, *nine fluid ounces.* Add the chalk by degrees to the lemon juice heated, and mix them; then pour off the liquor. Wash the citrate of lime which remains, in repeated portions of warm water, and then dry it. On the dried powder pour the diluted sulphuric acid, and boil for ten minutes; express the liquor strongly through a linen cloth, and filter it through paper. Evaporate the filtered liquor with a gentle heat, so that crystals may form as it cools. To obtain the crystals pure, dissolve them in water a second and a third time; filter each solution, boil it down, and put it apart to crystallize."

This process, which was contrived by Scheele, will seldom require to be performed by the apothecary, as the crystallized acid is now manufactured very pure, and sufficiently reasonable, on the great scale.[3] The theory of the process is very simple. The lime of the chalk unites with the citric acid that exists ready formed in the lemon juice, and produces an insoluble citrate of lime, which precipitates united with some of the mucilaginous and extractive matter of the juice. These are separated by repeated washings; and the sulphuric acid, which is added to the dried citrate, decomposing it, owing to the superior affinity of the sulphuric acid for lime; a sulphate of lime forms while the citric acid is disengaged. The crystals of the first crystallization are dark coloured; which is partly owing to a portion of mucilage that still adheres to the citric acid, and partly to the excess of sulphuric acid acting on the citric acid and decomposing a portion of it. The repeated crystallizations free the crystals from this dark colour; but as it is of some importance to avoid any hurtful excess of sulphuric acid, and as the strength of lemon juice is variable and uncertain, it is better to determine the quantity of acid required by the quantity of chalk employed. For this purpose a portion of the sulphuric acid intended to be used must be previously saturated with the chalk, and the weight of the portion employed accurately ascertained; by the knowledge of which the exact quantity of sulphuric acid required to decompose the citrate may be found. According to the experiments of Proust[1], 94 ounces of lemon juice saturate 4 ounces of chalk with citric acid, and produce 7½ ounces of dry citrate, which require for their decomposition, and the complete saturation of the lime they contain, 20 ounces of diluted sulphuric acid, composed of one part of the common acid and three parts of water, or of a specific gravity of 1·15. To ascertain, however, the exact point of saturation of the lime with the sulphuric acid, take a little of the clear supernatant fluid, filter it and add to it a few drops of acetate of lead; if no sulphuric acid be present citrate of lead only will be formed, soluble in nitric acid which does not dissolve sulphate of lead.

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[1] To free it from the oil on which its odour depends, dissolve it in alcohol, and precipitate by water. *Phil. Mag.* xiv. 331.

[2] Acide Citrique (*F.*) Acido Citrico (*I.*)

[3] The principal manufacturer in London, is Mr. Coxwell of Fleet Street.

Qualities. — Pure citric acid is in white, transparent, persistent, rhomboidal prisms, or of two four-sided pyramids joined base to base. It is inodorous; has an extremely acid, almost caustic taste; and reddens strongly the vegetable blues. One ounce of water at 60° Fahrenheit dissolves one ounce and a quarter of this acid; and at 212° twice its weight. The solution when long kept is liable to undergo spontaneous decomposition. Citric acid combines with the alkalies, earths, and metallic oxides, and forms citrates. The sulphuric and nitric acids decompose it. Its components according to Berzelius are 41·37 carbon, 3·80 hydrogen, and 54·83 of oxygen, in unknown proportions. Citric acid may be adulterated with tartaric acid; or with citrate of lime. The first is discovered by nearly saturating the solution with carbonate of potash, when an insoluble super-tartrate will be formed if the tartaric acid be present; the second is detected by dissolving the crystals in water, saturating the solution with ammonia, and adding to it some oxalate of ammonia, which will instantly precipitate the lime, if present.

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[1] *Journal de Physique*, lii. 366.

Medical properties and uses.—The solution of this acid in water, in the proportion of ℥j of the crystals to Oj of water, answers nearly all the purposes of recent lemon juice; and is even preferable for forming the common effervescing draught with carbonate of potash. A solution of ℈j in Oj of water, sweetened with sugar that has been rubbed on fresh lemon peel, forms a grateful refrigerant beverage, resembling lemonade, and equally useful in febrile and inflammatory complaints. It is said that the crystallized acid is not equally useful in scurvy as the fresh juice of the fruit.

ACI'DUM MURIA'TICUM. Lond.[1] *Muriatic Acid.*

"Take of muriate of soda dried, *two pounds;* sulphuric acid, (by weight,) *twenty ounces;* distilled water, *a pint and a half.* First mix the acid with half a pint of the water, in a glass retort; and when the mixture is cold, add to it the muriate of soda. Pour the remainder of the water into the receiver; and having fitted it to the retort placed in a sand bath, distil over the muriatic acid into this water, with a heat gradually raised until the retort becomes red hot.

"The specific gravity of muriatic acid is, to that of distilled water, as 1·160 to 1·000. If a piece of limestone be immersed in a fluid ounce of it diluted with water, the quantity dissolved ought to be two hundred and twenty grains."

Edinburgh.

"Take of muriate of soda, which has been previously exposed to a red heat, sulphuric acid, water, of each *two pounds.* Pour the acid, mixed with eight ounces of the water and cooled, upon the muriate of soda, in a glass retort; to which adapt a receiver, containing the remainder of the water, and distil from a sand bath with a moderate fire. In a short time the vessels may be luted together, and the distillation continued to dryness.

"The specific gravity of this acid is, to that of distilled water, as 1·170 to 1·000.

Dublin.

"Take of muriate of soda dried, sulphuric acid, water, of each *six pounds.* Dilute the acid with the water, and after it is cold, add it gradually to the muriate put into a glass retort; then distil the liquor until the residuum becomes dry.

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[1] Spiritus Salis, P. L. 1720. Spiritus Salis Marini Glauberi, P. L. 1745. Acide Muriatique (*F.*) Kochsalzsäure (*G.*) Acido Muriatico (*I.*) Ooppoo trāvagum (*Tam.*)

"The specific gravity of this acid is, to that of distilled water, as 1·170 to 1·000."

The principal difference in these formulæ is in the quantity of sulphuric acid ordered for decomposing the muriate. The sulphuric acid is properly ordered to be diluted, to moderate the strong effervescence, and prevent the too rapid disengagement of the muriatic acid gas, which would both endanger the bursting of the apparatus, and render the process otherwise very unmanageable. The direction of the London and Edinburgh Colleges, to put part of the water into the receiver, is preferable to mixing the whole with the acid, and pouring it on the muriate, as it facilitates very much the condensation. In the manufacturing laboratories, although the process is in principle the same as the above, yet the retort is generally of earthenware or of iron, which communicates the yellow colour that characterizes the common muriatic acid, and which depends on a small portion of iron being raised, and brought over with the acid. Even when iron vessels are not employed the acid often assumes a yellowish colour, which depends either on a small portion of iron in the salt, or from the presence of some oxymuriatic acid.

In this process the decomposition of the muriate of soda is effected by the superior affinity of sulphuric acid for soda; but it would scarcely be so complete were not the affinity of the muriatic acid for the soda also weakened by the heat, which favours its tendency to assume the elastic form, in which state it passes over into the receiver, and is there condensed by the water. The residue of the process is sulphate of soda with an excess of acid; to separate which, without breaking the retort, boiling water may be poured into the retort, after its contents have cooled down to 212°.

Qualities. — Liquid muriatic acid, thus obtained, is a colourless or very pale straw-coloured fluid: it has a strong pungent odour, an intensely sour caustic taste; reddens strongly the vegetable blues, emits white suffocating fumes when exposed to the air, and erodes animal and vegetable substances. It unites with the alkalies, earths, and metallic oxides, forming muriates. When of the specific gravity directed by the Edinburgh and Dublin Pharmacopœias, 100 parts of it, according to Dr. Ure's experiments, contain about 26·32 of real acid; and that by the London 24·90: at least it should be so; but by the present process of the London College the sp. gr. of the acid obtained is 1·142 instead of 1·160; and f℥j; decomposes

204 grains of marble only instead of 220, as stated by the college.[1] The following part of a table, constructed by Dr. Ure[2], shows the quantity of real acid contained in 100 parts of fluid acid, of different densities, at the temperature of 60°:

Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.
1·1920	28·30	1·1698	24·90	1·1391	20·37	1·1155	16·98
1·1900	28·02	1·1661	24·34	1·1351	19·81	1·1115	16·41
1·1881	27·73	1·1587	23·20	1·1312	19·24	1·1037	15·28
1·1863	27·45	1·1550	22·64	1·1293	18·96	1·0999	14·72
1·1790	26·32	1·1510	22·07	1·1253	18·39	1.0883	13·02
1·1753	25·75	1·1491	21·79	1·1233	18·11	1·0805	11·88
1·1715	25·19	1·1471	21·51	1·1214	17·83	1·0707	10·47
1·1679	24·62	1·1410	20·66	1·1194	17·55	1·0590	8·77

Notwithstanding the endeavours of all the most eminent chemists to ascertain the components of muriatic acid, they remain still unknown. It cannot be obtained perfectly free from water; although in some combinations it is nearly so; in which state Sir H. Davy has ascertained that its acidity is suspended, but is instantly restored on the addition of water. The fluid muriatic acid found in the shops often contains sulphuric acid and small portions of iron, sometimes copper; the first is detected by diluting the acid with 5 or 6 parts of distilled water, and adding a few drops of muriate of barytes[3], which is precipitated white if sulphuric acid be present; iron is discovered by saturating the diluted acid with carbonate of soda, and adding prussiate of potash; if a blue precipitate be formed, it may be concluded that iron is present. A blue colour being produced by supersaturating the acid with ammonia detects copper.

Medical properties and uses. — This acid is tonic, and antiseptic. It has been efficaciously used in typhus fevers, and in some cutaneous eruptions. It is a common and useful adjunct to gargles, in the proportion of from fʒſs to fʒij in f℥vj of any fluid, in ulcerated sore-throats, and cancrum oris; and, in a very highly diluted state, viz. ♏viij in f℥iv of water, it has been recommended as an injection in gonorrhœa.

This acid has even been regarded as an antidote in general syphilitic affections; but the observations of Mr. Pearson have showed this opinion to be erroneous; yet, by its salutary effects on the stomach and general health, "it is a medicine capable of ameliorating the appearance of venereal ulcers, and of restraining for a time the progress of the disease," where it is desirable "to gain a little time, previously to the entering on a mercurial course."[1] The dose is from ♏x to ♏xx in a sufficient quantity of water. When taken as a poison, it may be detected by its sensible qualities; but if mixed with wine or other fluids, let a portion of it be distilled from a small retort over a candle, into a phial containing a solution of nitrate of silver. The precipitation of muriate of silver, which is soluble in ammonia, but not in nitric acid, will take place if the poison contain muriatic acid. The best antidotes, if exhibited in time, are soap and calcined magnesia suspended in water.

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[1] *Philips's Experimental Examination*, p. 11.

[2] Dr. Ure has given satisfactory proofs of the erroneous data on which Mr. Kirwan's table was formed. *Annals of Phil.* vol. x. p. 369.

[3] Mr. Hume discovered that muriatic acid precipitates muriate of barytes when no sulphuric acid is present; but this does not happen when the acid is much diluted.

A very important property of muriatic acid, in the state of gas, is the power it possesses of neutralizing putrid miasmata, discovered by Morveau in 1773. It is therefore used as an agent for destroying infection in sick-rooms and hospitals, disengaged by pouring sulphuric acid on common salt.

Officinal preparations. *Murias Barytæ.* E. *Solutio Muriatis Calcis.* E. D. *Tinctura Ferri Muriatis.* L. E. D.

ACIDUM MURIATICUM DILUTUM. Dub. *Diluted Muriatic Acid.*

"Take of muriatic acid, and of distilled water, each *one pound by weight*. Mix them. The specific gravity of this acid is, to that of water, as 1·080 to 1·000."

This formula is intended to render the dose of muriatic acid more easily apportioned: 100 parts contain about 14 of real acid.

AQUA OXYMURIATICA. Dub.[2] *Oxymuriatic Water.*

"This is prepared by transmitting the superfluous gas of the process for making the solution of oxymuriate of soda, *aqua alcalina oxymuriatica*, by means of a proper apparatus, through a pint of distilled water.

"The specific gravity of this solution is, to that of water, as 1·003 to 1·000."

In the process by which this acid solution is prepared, the oxymuriatic acid comes over in the gaseous form, and is condensed in the distilled water, which is placed in a Woolfe's bottle, connected by a tube with a receiver that contains a solution of subcarbonate of potash. The gas first passes through the alkaline solution, part of it condenses and combines with the potash, forming a neutral salt, while the superfluous uncondensed portion passes on to the next bottle, and there combines with the water; forming this solution, which is generally termed oxymuriatic acid. It ought to be preserved in opaque bottles, as light decomposes it.

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[1] *Pearson on Remedies for Lues Venerea*, 194.

[2] Acide muriatique oxigéné (*F.*) Vollkomme Salzsäure (*G.*) Acido muriatico ossigenato (*I.*)

This acid was discovered by Scheele in 1774, while making his experiments on manganese.

Qualities. — The saturated solution of oxymuriatic acid has a very offensive suffocating odour; and a harsh, styptic, but not acid taste. Its colour is a very pale yellowish green; it destroys all the vegetable colours, rendering them white; and is itself decomposed by exposure to light; owing either to oxygen gas being disengaged by the light; or, according to the new theory, to the decomposition of the water, the hydrogen of which, uniting with the chlorine, forms muriatic acid, that remains in solution in the water, while the oxygen is set free. At a temperature of 50° this solution contains about twice its volume of real acid, the constituents of 100 parts of which, following the old theory, according to the experiments of Berthollet, corrected by those of Chenevix, are 84 of muriatic acid, and 16 of oxygen.[1]

Medical properties and uses. — Fluid oxymuriatic acid is stimulant and antiseptic. It has been strongly recommended in scarlatina and malignant sore throat; and as an antisyphilitic remedy. In the latter disease the same opinion may be given of it as of the simple muriatic acid; but in scarlatina and cynanche maligna more benefit has resulted from its use. From fʒſs to fʒij, mixed in f℥viij of water, and sweetened with a little syrup, may be taken in the course of the day, in divided doses.

But the most important use of oxymuriatic acid is in its gaseous form, as a fumigation for neutralizing putrid miasmata, and correcting the infectious atmosphere of hospital wards and rooms in which have been cases of contagious fevers. For these purposes it is better adapted than the common muriatic acid gas; but as both of them are highly deleterious to animal life, they should be employed in such apartments only as the sick can be removed from while the gas is extricated. The oxidized vapours are easily procured by pouring fʒvj of strong sulphuric acid on a mixture of ʒiv of pulverized manganese, ʒviij of common salt, and fʒij of water, in a china cup. The doors of the room to be fumigated must be kept shut for two hours after the cup with this charge is placed in it; then be thrown open, and a free current of air permitted to pass through the apartment. By this process the offensive odour of the sick room is destroyed, the chemical constitution of the deleterious atmosphere altered, and its freshness completely restored.

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[1] *Chemical Statics*, ii. 169.

For the more convenient application of this powerful agent, Morveau has invented what he terms disinfecting or preservative bottles. The apparatus consists of a strong glass bottle or phial, covered with a plate of glass, which is fitted by grinding so as to shut accurately the orifice of the vessel. The bottle is fixed in a wooden frame; and the plate of glass kept in its place, and closely applied by means of a screw. If the bottle be of 25 cubic inches of capacity, the charge to be put into it may consist of 372 grs. of black oxide of manganese in coarse powder, 3·5 cubic inches of nitric acid of 1·4 specific gravity, and an equal bulk of muriatic acid of 1·134 specific gravity. As soon as the charge is introduced, the glass plate must be firmly screwed down in its place. When the apparatus is to be used, the screw is to be turned so as to allow the gas which is extricated to escape from under the plate of glass; and this must be again screwed down, as soon as the smell of the oxymuriatic gas is perceptible in the distant corners of the apartment. Bottles of any dimensions may be used, but the charge must in no case occupy more than one-third part of the capacity of the vessel.

ACIDUM NITRICUM, Lond.[1] *Nitric Acid.*

"Take of nitrate of posash dried, and sulphuric acid, each *two pounds;* mix them in a glass retort; and distil the nitric acid from a sand-bath, until red vapours are produced. Then having added an ounce of dried nitrate of potash, redistil the acid in a similar manner.

"The specific gravity of this acid is, to that of distilled water, as 1·500 to 1·000. If a piece of limestone be immersed in a fluid ounce of it diluted with water, 480 grains ought to be dissolved."

Edinburgh.

"Take of nitrous acid, *any quantity.* Put it into a retort, and having fitted a receiver, which must be kept cold, apply a very gentle heat until the reddest part shall have passed over, and the acid which remains in the retort already almost free from colour, have become nitric acid."

ACIDUM NITROSUM. Edin. *Nitrous Acid.*

"Take of nitrate of potash bruised, *two pounds;* sulphuric acid, *sixteen ounces.* Pour the acid upon the nitrate of potash in a glass retort, and distil from a sand bath with a gradually augmented heat, until the iron pot becomes obscurely red hot.

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[1] Acidum Nitrosum, P.L. 1787. Spiritus Nitri Glauberi. Aquafortis, P.L. 1745. Aquafortis simplex et duplex, P.L. 1720. Acide nitrique (*F.*) Salpeter säure (*G.*) Acido Nitrico (*I.*)

"The specific gravity of this acid is, to that of distilled water, as 1·520 to 1·000."

Dublin.

"Take of nitrate of kali, *six pounds;* sulphuric acid, *four pounds* by weight. Mix and distil until the residue becomes dry.

"The specific gravity of this acid is, to that of distilled water, as 1·500 to 1·000."[1]

In performing these processes it is advisable to use a Woolfe's apparatus, or a range of two or three globular receivers, the last of which should contain a small portion of water. The nitric acid is separated from its combination with potash in the nitrate by the superior affinity of the sulphuric acid for the potash, which, however, requires to be aided by quantity, a larger portion of sulphuric acid than is necessary for saturating the potash of the nitrate being used; and also by heat, which volatilizes the nitric acid as it is disengaged. As soon as the materials are heated, orange-yellow vapours are disengaged, which in a short time become paler, and continue so until the ingredients in the retort are nearly dry, and the heat is much augmented; when, owing to a partial decomposition of the acid next disengaged, nitrous oxide comes over in deep red fumes, with a quantity of permanently elastic pure oxygen, which may be collected in an inverted receiver filled with water, placed in a pneumatic trough, and connected with the last receiver by means of a bent tube. The nitrous oxide combines with the condensed acid in the receiver, deepens its colour, and gives it that form which constitutes nitrous acid. It is with the view of preventing this, that the London College has ordered so large a portion of sulphuric acid to be employed, the principal use of which appears to be to contribute a sufficient portion of water to preserve the constitution of the nitric acid; for although a larger proportion of this acid be obtained by following the directions of the London formula, yet it is actually weaker than that which is obtained either by the Edinburgh or the Dublin processes. The Edinburgh College orders the acid to be kept in this form; and as a medical agent it answers the same purposes as the colourless acid; for, when both are diluted with water, they have the same appearance, and are brought to the same state, the addition of the water expelling completely the nitrous oxide, which is only loosely united with the nitric acid to form the nitrous. The quantity of acid obtained is about half the weight of the nitrate employed; and the residue is a white spongy saline cake of sulphate of potash with an excess of sulphuric acid, which may be dissolved out of the retort by hot water.

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[1] For the preparation of this acid on a large scale in this country, rough nitre with half the weight of sulphuric acid is employed. These are put into a large glass *body*, to which a glass pipe is luted communicating with an empty receiver, which is connected, by means of pipes also, with several other receivers half filled with water.

By the London process the nitric acid is at first obtained tolerably free from nitrous oxide; but in general the re-distillation, as directed, will be found necessary. In the expulsion of the nitrous oxide, to change the nitrous into nitric acid, according to the directions of the Edinburgh College, a portion of the acid is carried over with the gas, as nitrous acid vapour; which should not be wasted, but be condensed by a small portion of water being put into the receiver, and thus form a diluted acid. Mr. Murray[1] justly observes, that the heat of a water-bath is best adapted for this operation, being sufficient for the purpose, and not too high to produce the decomposition of the acid. A completely colourless acid, however, is not obtained, unless the acid be re-distilled from a small portion of black oxide of manganese, but this is not at all necessary for medical purposes.[2]

As nitre sometimes contains a small portion of muriate of soda, nitric acid, in whatever method it has been procured, may be contaminated with a minute portion of muriatic acid; or of sulphuric acid, if a large proportion of this has been used for decomposing the nitre: the presence of the first is detected by dropping in nitrate of silver, which forms an insoluble muriate of silver; while the formation of a precipitate on the addition of muriate of barytes discovers the second. These contaminations do not affect the medicinal virtues of the acid.

Qualities. — *Nitrous* acid, as the term is understood in the Edinburgh Pharmacopœia, is a yellow or orange-coloured fluid, emitting, when exposed to the air, deep-orange-coloured extremely suffocating fumes. In its chemical affinities and other qualities it agrees in many respects with nitric acid. It consists of nitrous gas loosely combined with nitric acid and water; and the colour varies according to the proportion of nitrous gas which is present. From experiments made by Sir H. Davy[3] on this subject, the following appear to be the proportions in the three states in which nitrous acid is usually procured for pharmaceutical purposes.

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[1] *System of Materia Medica*, ii. 184.

[2] Nitric acid was first obtained by Raymond Lully, in the 13th century, by distilling a mixture of nitre and clay, a process still employed on the continent. The name *Nitric acid* was imposed in 1787, by the French chemists.

[3] *Researches*, 37.

100 Parts of Acid.	Spec. Gravity.	Real Nitric Acid.	Water.	Nitrous Gas.
Pale yellow	1·502	90·5	8·3	1·2
Bright yellow	1·500	88·94	8·10	2·96
Dark orange	1·480	86·84	7·6	5·56

The Edinburgh College states the specific gravity too high, for it seldom exceeds 1·502, and scarcely ever 1·52.[1] When one part by weight of water is added to four parts of yellow nitrous acid, the colour is altered to a fine green; when equal parts of both are mixed, it becomes blue; and by another addition of water, or by allowing it to stand exposed to the air, it changes to a very pale straw-colour, or becomes nearly colourless.

Nitric acid is a colourless, or very pale yellow, limpid fluid, emitting, when exposed to the air, white suffocating vapours, and possessing strong acid properties. It is highly corrosive, and tinges the skin yellow, the tint remaining till the epidermis peels off. It unites with water in every proportion, and while mixing heat is evolved. The following table, constructed by Sir H. Davy[2], shows the quantity of real acid and water contained in 100 parts of fluid acid of different densities:

100 Parts Nitric Acid of specific gravity.	Contain of		100 Parts Nitric Acid of specific gravity.	Contain of	
	True Acid.	Water.		True Acid.	Water.
1·5040	91·55	8·45	1·3186	52·03	47·97
1·4475	80·39	19·61	1·3042	49·04	50·96
1·4285	71·95	28·35	1·2831	46·03	53·97
1·3906	62·96	37·04	1·2090	45·27	54·73
1·3551	56·80	43·12			

Nitric acid is volatilized by heat, and decomposed by light. It is also decomposed by all the simple combustibles, with great violence of action; is capable of oxidizing all the metals; and combines with the earths, alkalies, and metallic oxides, forming nitrates; one fluid ounce of specific gravity 1·500 should dissolve 476 grains of white marble. The constituents of nitric acid, independent of the water, which gives it the fluid form, are 25·97 azote, and 74·03 oxygen, in 100 parts.

Use. — Strong fluid nitric acid is used only for pharmaceutical purposes; except when extricated in the form of vapour when it is employed for destroying contagion. It is less powerful than the oxymuriatic acid, but is more generally useful, as it can be extricated in the chambers of the sick without proving deleterious to animal life.[1] For this purpose fʒij of sulphuric acid may be poured over ʒiv of coarsely powdered nitre in a china cup, and placed in a pipkin of hot sand. This quantity is sufficient for fumigating a room of ten feet square; and, where a larger portion is required, it is more advisable to multiply the number of pipkins, than to put a larger quantity of the materials into one vessel.

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[1] Rouelle states the specific gravity of the strongest nitric acid that can be procured to be 1·583; Kirwan makes it 1·5543 only, at 60° Fahrenheit.

[2] *Researches*, 41.

Officinal preparations. *Acidum nitricum dilutum.* L. E. D. *Argenti Nitras.* L. E. D. *Ung. Hydrargyri Nitratis.* L. E. D. *Hydrargyri Nitrico-oxydum.* L. *Spiritus Ætheris nitrici.* L. E. D. *Unguentum Acidi nitrosi.* E. D.

ACIDUM NITRICUM DILUTUM. Lond. *Diluted Nitric Acid.*

"Take of nitric acid, *a fluid ounce;* distilled water, *nine fluid ounces.* Mix."

ACIDUM NITROSUM DILUTUM. Edin. *Diluted Nitrous Acid.*

"Take of nitrous acid, and of water, *equal weights.* Mix, avoiding the noxious vapours."

Dublin.

"Take of nitrous acid, and of distilled water, each *one pound.* The specific gravity of this mixture is, to that of distilled water, as 1280 to 1000."

These processes are intended for the more convenient apportionment of the dose in the exhibition of this acid. In the former edition of the London Pharmacopœia the proportions of acid and water were equal by weight; but the alteration in the present edition makes a very important difference of strength, in a given measure of the diluted acid, prepared after the former, and the latter of the above formulæ.

When prepared according to the directions of the London College, f℥i contains about grs. 68·17 of nitric acid, of 1·500 specific gravity, while the same measure of the same acid, prepared after the Edinburgh and Dublin, and the former London formulæ, contains grs. 390·5 of the same acid; a difference which may lead to errors in practice; and is, therefore, to be regretted, particularly as no reason is assigned for the change.

Medical properties and uses.—Nitric acid is tonic and antiseptic. When largely diluted with water it forms an agreeable and very useful beverage in fevers, particularly of the typhoid type. In larger doses, less diluted, it has been efficaciously administered in chronic hepatitis, even when dropsy has supervened; and has also been found serviceable in restraining violent sickness, in dyspepsia, asthma, and the majority of the cachexiæ. From some observations of Mr. Scott, published at Bombay in 1796, this acid excited considerable attention as a remedy for syphilis; but after the most ample trials, by almost every practitioner of any eminence in the country, its antisyphilitic powers have not been found by any means to answer the accounts of them transmitted from India. The subsequent publications of Dr. Scott, however, have shown, that he did not employ nitric acid, but a mixture of three parts of muriatic acid, and two of nitric. It checks for a time the progress of the disease, but does not permanently remove the symptoms; and, as Mr. Pearson justly observes, "it would by no means be warrantable to substitute the nitrous (or nitric) acid in the place of mercury, for the cure of venereal [1]complaints." It is, however, in many cases of much benefit during a mercurial course, or prior to its commencement, when the constitution is impaired, and inadequate to support the effects of mercury; as by its tonic powers it promotes the general health, and lessens the action of the mercurial remedy on the mouth and fauces: yet when it is pushed far, it affects the mouth, and produces ptyalism. When dropsy supervenes on reiterated courses of mercury, which is not unfrequent in broken down constitutions, this acid, Mr. Carmichael observes, given in as large doses as the stomach will permit, conjoined with digitalis, is productive of the utmost benefit. We have found it of considerable service, given at the same time with mercury, in old obstinate ulcerations of the legs, although no venereal taint could be suspected: and it is employed with benefit as a local stimulant in the form of lotion, in the proportion of f℥ij of the diluted acid, to Oj of water, to fœtid ulcers, attended with a thin ichorous discharge, and in caries of the bones. In India, and in this country for some years past, it has been used combined with muriatic acid, in the form of a bath, and in this state produces the same effects as when it is taken internally. Diluted nitric acid has often been employed as a poison. It is detected by the orange-coloured spots, which are observed on the lips, chin, and hands of the patients; and, if death be the result, by the same colour being found in a large portion of the alimentary canal, the mucous membrane of which is converted into a fatty substance, and the stomach often perforated. If any of the fluid can be obtained, the extrication of orange-coloured fumes on boiling it over copper filings, is a certain test of aquafortis. Soap, and calcined magnesia suspended in water, are the best antidotes.

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[1] *The Effects of Nitrous Vapour, &c. by J. C. Smyth, M.D.*

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[1] *Pearson on Remedies for Lues Venerea*, 188.

The dose of the diluted acid is from ♏x to ♏xxx in f℥iij of water, given three or four times a day. When used as a bath, the mixed acid should be added to the water, until it is about as sour as weak vinegar.

ACIDUM SUCCINICUM. Edin.[1] *Succinic Acid.*

"Take of amber in powder, and pure sand, *equal parts*; mix and put them into a glass retort, of which they may fill one half. Having adapted a large receiver, distil from a sand-bath, with a gradually raised fire. A watery liquor with a little yellow oil will first distil over: then a yellow oil with an acid salt; and lastly, a reddish and black oil. Pour the liquor out of the receiver, and let the oil be separated from the water. Press the acid salt collected in the neck of the retort, and on the sides of the receiver, between folds of bibulous paper, that it may be freed from the adhering oil; then purify it by solution, in hot water and crystallization."

ACIDUM SUCCINICUM. Dub. *Succinic Acid.*

"Take of amber, and pure sand, each *a pound*. Distil, with a gradually increased heat, an acid liquor, an oil, and a salt discoloured with oil. Wrap up this salt in bibulous paper, and subject it to the press to separate the oil; then let it be again sublimed."

The use of the sand in these processes is to prevent the amber, which swells very much, from passing over into the receiver. The heat which is necessary for the complete decomposition of the amber is very considerable; and therefore, by following exactly the formulæ of the Colleges, this is scarcely ever accomplished. The succinic acid is partly dissolved in the water which condenses in the receiver, but the greater part is sublimed in the neck of the retort, and is so much contaminated with the oil, that after repeated solution and crystallization, and even resublimation, it still retains a portion of it. According to Guyton Morveau[2], it may be obtained perfectly pure by distilling from it a small portion of nitric acid, with a heat not strong enough to sublime the succinic acid.

Qualities.—The crystals of succinic acid are minute triangular prisms. When pure, they are white, translucent, and shining; have a slight penetrating sour taste; redden infusion of litmus, and are volatile and inflammable, burning away without leaving any odour. They are soluble in 24 parts of water at 60°, and 2 parts at 212°; the greater part however crystallizing as the water cools. They are also soluble in alcohol, and in sulphuric and nitric acid, without suffering decomposition. With the alkalies, earth, and metallic oxides, succinic acid combines and forms succinates. It is a triple compound of 47·600 parts of carbon, 4·512 of hydrogen, and 47·888 of oxygen.[1]

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[1] Acide Succinique (*F.*) Bernsteinsäure (*G.*) Acido Succinico (*I.*)

[2] *Annales de Chimie*, xxix. 165.

This acid is often adulterated with tartaric acid, muriate of ammonia, and sulphate of potash. The first is detected by carbonate of potash; the second, by nitrate of silver; and the sulphate by barytic water. It is altogether discarded from practice.

ACIDUM SULPHURICUM DILUTUM.[2] Lond. *Diluted Sulphuric Acid.*

"Take of sulphuric acid, *a fluid ounce and a half;* distilled water, *fourteen fluid ounces and a half.* Add the acid gradually to the water, and mix."

Edinburgh.

"Take of sulphuric acid, *one part;* water, *seven parts;* mix them."

Dublin.

"Take of sulphuric acid, *two ounces by weight;* distilled water, *fourteen ounces by weight.* Mix them gradually, and set the mixture aside to cool; then pour off the clear liquor. The specific gravity of this acid is, to that of water, as 1090 to 1000."

It is very much to be regretted, that the London College, when it altered the proportions of acid and water in this mixture, from those in the last edition of its Pharmacopœia, did not adopt the proportions ordered by the two other colleges, so that, in this preparation at least, a standard strength might have been fixed for the whole kingdom. The reasons which induced it to adopt the present proportions are not easy to be conceived; for the puerile reason stated by Dr. Powell, that "this mixture will be more conveniently made, and its dose more easily apportioned than the former one," cannot surely have operated in causing the alteration. The diluted acid of the former edition of the London Pharmacopœia consisted of eight parts by weight of water, and one of acid, or the mixture contained $\frac{1}{9}$ of strong acid; while the proportions of the present diluted acid are nearly five parts and a half by weight of water to one of acid; or, one fluid ounce of the diluted acid contains 78·82 grains of the strong acid: in the Edinburgh and Dublin pharmacopœias it constitutes an eighth part.

Owing to the great affinity of sulphuric acid for water, and the density of the mixture being much greater than the mean of the separated acid and water[3], a very considerable increase of temperature is produced during their combination, sufficient to crack the glass vessels in which it is made, if the two ingredients be at once mixed together.[1] To prevent such an accident, the acid must be gradually added in small portions to the whole of the water, and the mixture agitated after every addition. It is of importance always to ascertain the specific gravity of the acid before the mixture be made. The mixture, when it has cooled down to the temperature of the atmosphere, lets fall a white precipitate, consisting of a small portion of sulphate of potash, and of sulphate of lead, which the strong acid always contains, but which the diluted acid is incapable of holding in solution. The diluted acid is thus purer than the strong acid, which suffers no other alteration except in point of strength: and hence the Dublin College properly directs the clear liquor to be poured off when the mixture has cooled.

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[1] *Annals of Philosophy*, vol. v. p. 99.

[2] Acidum Vitriolicum dilutum, P. L. 1787. Acide sulphurique étendu d'eau (*F.*) Verdüunte Schwefelsäure (*G.*) Acido solforico diluito (*I.*)

[3] It is a curious fact that, after the mixture has cooled down to the temperature of the atmosphere, a considerable time elapses before it acquires its real density.

Medical properties and uses.—Diluted sulphuric acid is tonic, antiseptic, and refrigerant. Its tonic and antiseptic powers, render it extremely serviceable in low typhoid fevers, dyspeptic affections, diabetes, convalescencies, and in cutaneous eruptions. It restrains the colliquative sweats which attend hectic: locally applied, it is a common and useful adjunct to gargles in cynanche, and to check salivation; and as a refrigerant, it is given with certain benefit in passive hæmorrhagies, from whatever part they may arise. In the first-mentioned cases, the diluted acid may be combined with infusions of cinchona or other vegetable bitters, and aromatics; and in the latter, with infusion of roses, mucilage, or simple water sweetened with syrup. The usual dose is from ♏ x to ♏ xxx, but in malignant erysipelas, with a tendency to hæmorrhagy, it has been given to the amount of f℥j in twenty-four hours; and we have given it, with evident advantage, to the same amount, in violent uterine hæmorrhagies.

ACIDUM SULPHURICUM AROMATICUM. Edin.

Aromatic Sulphuric Acid.

"Take of alcohol, *two pounds;* sulphuric acid, *six ounces.* Drop the acid gradually into the alcohol. Digest the mixture in a covered vessel with a very gentle heat for three days; then add of cinnamon bark, bruised, *one ounce and a half;* ginger root, bruised, *one ounce.* Digest again in a closed vessel for six days; then filter through paper placed in a glass funnel."

This preparation is generally regarded as an imperfect ether; but we are of opinion that the reciprocal action of the acid and alcohol during the digestion is scarcely sufficient to produce such an effect; and the acid undoubtedly very much predominates. It is therefore a simple alcoholic solution of sulphuric acid, holding dissolved, also, the essential oil of cinnamon and of ginger.

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[1] If one part by weight of sulphuric acid of 1·845 specific gravity be mixed with one-fourth its weight of water, the caloric instantly evolved is sufficient to raise the thermometer from 60° to 300°.

Qualities.—The odour is peculiar and aromatic; the taste gratefully acid. It is limpid, and of a brownish colour.

Medical properties and uses.—This is an agreeable mode of exhibiting sulphuric acid in dyspepsia, chronic asthma, and most of the complaints for which the diluted acid has been found serviceable. The dose is from ♏x to ♏xxx in any convenient fluid vehicle, given three or four times a day.

ALKALIES[1] AND NEUTRAL SALTS.[2]

THE general term ALKALI comprehends under it substances possessed of very important chemical properties, and capable of producing very powerful effects on the animal œconomy. They have an acrid, urinous taste; are caustic, or dissolve animal matter; change the blue vegetable colours to green; serve as the means of combining oil and water; are capable of being fused and volatilized by a strong heat; have a great affinity for water; and combine with acids, forming neutral salts, in which the qualities of both the components are lost. The discoveries of Sir H. Davy have clearly established that the greater number of them are compound bodies. They are affected by the air, and require to be preserved in well-stopped glass bottles.

NEUTRAL SALTS have neither acid nor alkaline properties; but salts are formed by the combination of acids with alkalies, in which the properties of the one or the other predominate; and consequently, although these are *secondary* salts, yet they cannot, in strict language, be denominated *neutral* salts. When the acid predominates, the salt is designated by the syllables *super* being added to the appellation of the neutral salt, formed with the same acid and alkali; but when the alkali is redundant, the syllable *sub* is added: thus, if to carbonate of potash, be added a redundance of acid, it becomes a supercarbonate of potash; but if there be a deficiency of acid, the salt is a subcarbonate of potash; and as there are two varieties of acids formed from the combination of the same base or bases with different proportions of oxygen, so it has been found also necessary to distinguish the salts formed with them by different terminations: thus the salt composed of *sulphuric* acid and potash, is termed *sulphate* of potash, while that formed with *sulphurous* acid and the same alkaline base is termed *sulphite* of potash. When the acid has the term *oxy* prefixed to its name, the same syllables are prefixed to that of the salt thus *oxymuriate of potash*, denotes a salt composed of the oxymuriatic acid and potash.

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[1] The words *Kali* and *Alkali* are of Persian origin, and derived from the terms كليا and والكلي or *Kalia* and *Alkalia*, signifying the ashes of marine plants. Vide *Good's Nosology*, *Prelim. Disc.* p. xcv.

[2] The title of this section in the London Pharmacopœia is *Alkalies and their Salts*; but as these salts cannot be termed Salts of alkalies, in strict language, we prefer to translate the phrase *Neutral Salts*.

The neutral and secondary salts have very different degrees of solubility; but that of almost all of them is increased by an augmented temperature, while their solution is for the most part accompanied with a diminution of temperature. They may be obtained unaltered from solutions by evaporation; and, if the process be slowly conducted, they form in regular crystallized masses, which have more or less transparency according to the quantity of water which they retain in their composition. Exposure to air, heat, and moisture, variously affect the appearance of crystallized salts. When they lose their transparency, and are covered with a white crust, or fall to powder, on simple exposure to the air, such salts are said to be *efflorescent*; if, on the contrary, they attract moisture from the atmosphere and become fluid, they are named *deliquescent*; and *permanent*, when the air has no effect on their crystals. The circumstance of a salt first melting in a moderate heat, then becoming covered with a white crust, and ultimately being converted into a dry opaque mass, is termed *watery fusion*; but when, instead of melting, it splits and the fragments fly off with a crackling noise, this effect is termed *decrepitation.*

The efflorescent and deliquescent salts should be preserved, and dispensed in well stopped bottles; while those that are permanent will not suffer from being put up in paper.

The alkalies have been employed as poisons; in which case the practitioner ought to be able to distinguish them from other acrid or caustic poisons. The volatile alkali is readily known by its odour; but if any of the fixed alkalies have been taken, besides the characters already enumerated, and which merely demonstrate the fact that the poison has been an alkali, the simplest method of ascertaining which of them it is, is to evaporate the solution, or some of the filtered fluid contents of the stomach to dryness in a silver spoon or vessel; after which, by exposing the mass to the air, if the alkali be potash it will rapidly deliquesce, but it will remain dry if it be soda. Vinegar is the best antidote of the alkaline poisons, when given early enough after the poison has been swallowed.

AMMONIÆ SUBCARBONAS.[1] Lond. *Subcarbonate of Ammonia.*

"Take of muriate of ammonia, *a pound*; prepared chalk, dried, *one pound and a half.* Pulverize them separately; then mix them, and sublime with a gradually increased heat, until the retort becomes red hot."

SUB-CARBONAS AMMONIÆ. Edin. *Carbonate of Ammonia.*

"Take of muriate of ammonia, *one part*; softer carbonate of lime, dried, *two parts.* Each being separately pulverized, mix them, and sublime from a retort into a receiver kept cold."

Dublin.

"Take of muriate of ammonia, reduced to powder, and well dried, carbonate of soda, dried, each *half a pound.* Mix: then put them into an earthen retort, and sublime with a heat gradually increased, into a receiver kept cold."

This salt is produced by a double decomposition of the substances employed. The lime of the chalk attracts the muriatic acid of the muriate of ammonia, while the carbonic acid is attracted by the ammonia. The muriate of lime which is formed remains in the retort, while the subcarbonate of ammonia sublimes and concretes into a cake on the sides of the receiver. The theory of the Dublin process, in which the carbonate of soda is ordered instead of chalk, is precisely the same, only less heat is required; but it is too expensive to be generally employed. The chalk, or the carbonate of soda, should be extremely well dried, and the ingredients very intimately mixed, that the decomposition may be as complete as possible. The retort should have a wide cylindrical neck; and the receiver have a nearly cylindrical form, to permit the concreted salt to be taken out without breaking the glass.[2]

Qualities. — Subcarbonate of ammonia has an ammoniacal pungent odour, and a slightly acrid, yet cooling taste. It is usually in a white semitransparent hard mass, which breaks with a striated fracture; has the specific gravity of 0·966[3];

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[1] Ammonia præparata, Sal cornu cervi, P. L. 1787. Carbonate d'ammoniaque (*F.*) Kohlensäures ammonium (*G.*) Sotto-carbonato d'ammoniaco (*I.*)

[2] This Salt is prepared, on a large scale, by sublimation from an iron pot, to which the heat is directly applied, and which is connected with a large earthen or leaden receiver. *Murray's System of Materia Medica*, ii. 228.

[3] *Annales de Chimie*, xxviii. 12.

and is totally volatilized, when pure, in a moderate heat. It is insoluble in alchol; is soluble in less than three parts of water at 60°, in an equal weight of warm water; but in the latter it effervesces and is partially decomposed. It changes the vegetable blues to green. Exposed to the air it gradually effloresces, and loses its pungent odour, owing either to the volatilization of the superabundant ammonia it contains, or to the absorption of carbonic acid from the air.[1]

Bergman makes its constituents to be 45 parts of carbonic acid, 43 ammonia, and 12 water, — in 100 parts; but this statement has been shown to be erroneous; and I am inclined rather to adopt that of Mr. Phillips[2], who makes the proportions to be 50 carbonic acid, 39 ammonia, and 11 of water. Sir H. Davy, however, has found that the quantity of alkali varies according to the temperature that has been employed in the preparation: thus, when it is formed at a temperature of 300°, it contains rather more than 50 per cent. of ammonia; but at a temperature of 60, it contains only 20 per cent.

Subcarbonate of ammonia is decomposed by the acids, the fixed alkalies and their subcarbonates, barytes and lime, and partially by magnesia.

Medical properties and uses.—This salt is stimulant, antispasmodic, antacid, diaphoretic, and in large doses emetic. It is beneficially given in gout, hysteria, and dyspeptic affections, when much acid is present in the stomach; and in infantine convulsions connected with dentition, or with acidity of the primæ viæ. As a diaphoretic it is occasionally exhibited in chronic rheumatism, in combination with guaiacum; and sometimes, although rarely, it is employed to produce vomiting in gouty and paralytic cases. From the ammonia it contains in excess, the subcarbonate is applied as a local stimulant to the nostrils in syncope, hysteria, and languors; and with the addition of a little scent forms the common smelling salts of the shops. The ordinary dose is from grs. v. to grs. xx, formed into pills, or dissolved in any aqueous vehicle; but to excite vomiting ʒſs may be given for a dose, and repeated, if necessary, assisting its operation by plentiful dilution.

Officinal preparations. *Liquor Ammoniæ Subcarbonatis*. L. *Liquor Ammoniæ Acetatis*. L. E. D. *Cuprum ammoniatum*. L. E. D.

LI'QUOR AMMO'NIÆ. Lond. *Solution of Ammonia.*[3]

"Take of muriate of ammonia, *eight ounces*; lime newly burnt, *six ounces*; water *four pints*. Pour one pint of the water upon the lime, then cover the vessel, and set it aside for an hour. Dissolve the muriate of ammonia in the remainder of the water whilst boiling, add to it the former mixture, and again cover the vessel; after the liquor has become cold, strain it, and distil twelve fluid ounces of solution of ammonia.

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[1] The neutral carbonate is inodorous.

[2] *Remarks on the Editio Altera of the Pharm. Lond.* p. 16.

[3] Aqua Ammoniæ puræ, P.L. 1787. Dissolution d'ammoniaque (*F.*) Atzender Ammonium-liquor (*G.*) Liquore di Ammoniaco (*I.*)

The specific gravity of the solution of ammonia is to that of distilled water as 0·960 to 1·00.[1]

AQUA AMMONIÆ. Edin. *Water of Ammonia.*

"Take of muriate of ammonia, *one pound;* lime newly burnt, *one pound and an half;* distilled water, *one pound;* water, *nine ounces.* Upon the lime broken to pieces pour the water in an iron or earthen vessel, cover it up, until the lime has fallen into powder and become cold, then rub the muriate to a fine powder, and triturate it with the lime in a mortar; after which put them directly into a bottle glass retort. Place the retort in a sand-bath, and adapt to it a receiver furnished with a tube passing into a phial containing distilled water: The phial, however, being sufficiently large to hold double the quantity of water. Then apply the fire, gradually raising it, until the bottom of the iron pot be red hot, and as long as gas and vapour are produced. The specific gravity of this solution of ammonia is to that of distilled water as 939 to 1000. It should be preserved in small phials well stopped."

AQUA AMMONIÆ CAUSTICÆ. Dub. *Water of caustic Ammonia.*

"Take of muriate of ammonia, *sixteen ounces;* lime newly burnt, *two pounds;* water, *six pints.* Effuse one pint of water upon the lime placed in an earthen vessel, and cover it up. Twenty-four hours afterwards, when the lime is crumbled to powder, mix with it the salt, avoiding the vapours; then put the mixture into a retort, and pour upon it the remainder of the water. Agitate them; and having luted carefully the joinings of the vessels, distil with a moderate heat into a cooled receiver twenty-one measured ounces of the liquor. The specific gravity of this solution should be to that of distilled water as 934 to 1000.

In these processes, the lime having a superior affinity for muriatic acid, decomposes the muriate, from which the ammonia is disengaged, and passes over in combination with the watery vapour. If the temperature of the water rises to

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[1] This process, which differs from that of the former edition of the Pharmacopœia, was suggested by Mr. Phillips; but more water is employed than he proposed, which he conceives to be objectionable; both because more fuel and larger vessels are required; and the total product is weaker in the proportion of about 9·5 to 13. Vide *Remarks in the Editio Altera of the Pharm. Lond.* p. 18.

130°, the ammonia is again separated in the form of gas; and hence the necessity of keeping the receivers cold. The product thus obtained is a saturated solution of ammonia; while muriate of lime remains in the retort, and may be dissolved out by twice its weight of water.

Qualities.— Liquid ammonia is a limpid colourless fluid. It has a very strong pungent odour, an extremely acrid taste, and inflames the skin. Obtained according to the London College, its specific gravity is ·9060, to the Edinburgh ·9039, while that of the Dublin College is ·9310. The following table shows the strength of liquid ammonia of different degrees of specific gravity within a certain range: (Temp. 50° Fah. Pressure 29·8 Barom.)

100 parts Sp. Grav.	Contain of		100 parts Sp. Grav.	Contain of	
	Ammonia.	Water.		Ammonia.	Water.
·9000	26·00	74·00	·9513	12·40	87·60
·9054	25·37	74·63	·9545	11·56	88·44
·9166	22·07	77·93	·9573	10·82	89·18
·9255	19·54	80·46	·9597	10·17	89·83
·9326	17·52	82·48	·9619	9·60	90·40
·9335	15·88	84·12	·9684	9·50	90·50
·9435	14·53	85·47	·9639	9·09	90·91
·9476	13·46	86·54	·9713	7·17	92·83[1]

For ordinary purposes it is useful to know, that a phial capable of containing 224 grains of distilled water can hold no more than 216 grains of the strong solution.

Liquid ammonia assists the oxidizement of copper and zinc; dissolves many of the metallic oxides; and unites with all the acids without effervescence, forming neutral salts. Its affinity for carbonic acid is so powerful, that it rapidly attracts it from the atmosphere; and hence the necessity of preserving it in well stopped small phials, as directed by the Edinburgh College. The acids, the metallic salts, and alum are incompatible in formulæ with it. The constituents of the ammonia it contains, according to the latest experiments of Mr. Davy, are 74 measures by bulk of hydrogen gas, and 26 of azotic gas; or, according to the analysis of Dr. Henry, 100 parts of ammonia consist of 80·36 of azote, and 19·64 hydrogen by weight.[2] The presence of carbonic acid in solution of ammonia may be readily detected by adding to it muriate of lime, which forms a precipitate if carbonic acid be present.

Medical properties and uses. — This solution of ammonia is stimulant, antacid, and rubefacient. It is usefully employed, when largely diluted, in paralysis, hysteria, and syncope; and is perhaps superior to all the other antacids in relieving cardialgia and other symptoms of acidity of the stomach. As a local stimulant it is applied to the nostrils in faintings; and a rag moistened with it, and laid over the scrobiculus cordis, sometimes raises an instantaneous blister, and, by merely inflaming the skin, always proves useful in spasms and gout in the stomach. Combined with a small portion of oil, it forms a saponaceous rubefacient, which is beneficially applied to the throat in inflammatory sore-throat, and as a friction in deep-seated inflammation and rheumatism. The dose of the solution is from ♏x to ♏xx in a large cupful of water or milk. When taken as a poison, if death be not the immediate result, the best antidote is vinegar.

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[1] *Davy's Researches*, p. 68.

[2] *Philosophical Transactions*, 1809.

Officinal preparations. *Hydro-sulphuretum Ammoniæ.* E. D. *Oleum ammoniatum.* E. *Spiritus Ammoniæ.* L. *Linimentum Ammoniæ.* L. D. *Spiritus Ammoniæ succinatus.* L.

AQUA AMMONIÆ DILUTA. Edin. *Diluted water of Ammonia.*

"Take of water of ammonia, *one part*; distilled water, *two parts.* Mix them together."

This preparation is probably intended for facilitating extemporaneous prescription; but as the solution of ammonia is never given except in a diluted form, it appears to be superfluous.

LI'QUOR AMMO'NIÆ ACETA'TIS. Lond. *Solution of Acetate of Ammonia.*[1]

"Take of subcarbonate of ammonia, *two ounces* (*diluted*); acetic acid, *four pints.* Add the acid to the subcarbonate of ammonia, until the effervescence ceases."

AQUA ACETATIS AMMONIÆ; Edin. *Water of Acetate of Ammonia.*

"Take of carbonate of ammonia in powder, *any quantity.* Pour upon it as much weak acetic acid as will exactly saturate the ammonia."

Dublin.

"Take of carbonate of ammonia, *two ounces.* Add by small portions, with frequent agitation, *three pints and a half* of distilled vinegar, or as much as will saturate the ammonia, which may be ascertained by means of litmus."

The subcarbonate of ammonia employed for this preparation, is decomposed by the acetic acid of the distilled vinegar; which, combining with the ammonia, forms an acetate that remains dissolved in the water, while the disengaged carbonic acid flies off in the form of gas, exciting effervescence. In our experiments, distilled vinegar of a specific gravity of 1007 required 320 grains of the subcarbonate to saturate a pint; hence the proportion ordered by the London and Dublin Colleges is just sufficient for saturating three pints.[1] Owing, however, to the variable proportion of acid in distilled vinegar, this preparation cannot be obtained of an uniform strength; and provided it be accurately neutralized it is of little importance. If it be not accurately saturated, some of the metallic salts, particularly those of antimony, which are often ordered in conjunction with it, are decomposed.[2]

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[1] Aqua Ammoniæ Acetatæ, P. L. 1787. Acetate d'ammoniaque liquide (*F.*) Essigsaures Ammonium liquor (*G.*) Liquore di Minderero (*I.*)

Qualities. — This solution is inodorous; has a slightly nauseous taste; and, when made with pure materials, is limpid and colourless. It is decomposed by the fixed alkalies, the strong acids, oxymuriate of mercury, and nitrate of silver, which are consequently incompatible in formulæ with it.

Medical properties and uses. —As a diaphoretic it is in common use in febrile diseases; and may be combined with opium, camphor, antimonials, or nitrate of potash. It is necessary to assist its determination to the skin with plentiful dilution, and a moderate degree of external heat: for by free exposure to cool air it excites the kidneys, instead of opening the skin. Externally it is employed as a discutient; as a lotion to inflamed surfaces; and when diluted with rose-water holding in solution a small portion of opium, it is an excellent collyrium in chronic ophthalmia; and still more largely diluted, is occasionally used as an injection in the commencement of gonorrhœa. The ordinary dose is from fʒij to fʒxij, given every three or four hours.

LI'QUOR 'AMMO'NIÆ SUBCARBO'NATIS.[3] Lond.

Solution of Subcarbonate of Ammonia.[4]

"Take of subcarbonate of ammonia, *four ounces*; distilled water, *a pint*. Dissolve the subcarbonate of ammonia in the water, and filter through paper."

SOLUTIO SUBCARBONATIS AMMONIÆ. Edin. *Solution of Carbonate of Ammonia.*

"Take of subcarbonate of ammonia, *one part*; distilled water, *four parts.* Dissolve the subcarbonate in the water, and filter through part."

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[1] The mercury of a thermometer, the bulb of which was immersed in the solution while effervescing, sunk five degrees.

[2] M. de Lassone obtained the salt crystallized by sublimation, in long slender flatted crystals, terminating in sharp points, an inch in length, and of a pearl-white colour. They are very deliquescent; impress on the tongue a sense of coldness and sweetness; melt at 170°, and sublime at about 250°. According to Richter, they consist of 68·77 acid, and 31·23. base. *Thomson's Chemistry*, 4th ed. vii. 62.

[3] Soucarbonate d'ammoniaque (*F.*) Kohlensaures Amonium liquor (*G.*) Liquore Sotto-carbonato di ammoniaco (*I.*)

[4] *Remarks on the Editio Altera of the Pharm. Lond.* p. 16.

AQUA CARBONATIS AMMONIÆ. Dub. *Water of Carbonate of Ammonia.*

"Take of muriate of ammonia, *a pound;* carbonate of soda, *twenty-eight ounces;* water, *three pints.* Distil off two pints, with a fire gradually raised. The specific gravity of this liquor is, to that of distilled water, as 1095 to 1000."

The formulæ of the London and the Edinburgh Colleges for this preparation are to be preferred, inasmuch as they obtain by simple solution the same result as is produced from the more complicated process of the other College. The theory of the Dublin process is the same as that of the preceding preparation. The soda of the alkali employed, unites with the muriatic acid of the muriate, while the ammonia combines with the carbonic acid, and the subcarbonate of ammonia thus formed is volatilized, and carried over with the watery vapour.

Qualities.—This solution has the odour and taste of the concrete subcarbonate; is limpid and colourless; and when shaken with twice its bulk of alcohol, a nearly uniform coagulum is formed. Its specific gravity should be 1150.

Medical properties and uses.—The same as those of the concrete salt. It is given in doses of from fʒſs to fʒj in any bland fluid.

LIQUOR VOLATILIS CORNU CERVINI.[1] Dub. *Volatile Liquor of Hartshorn.*

"Take of hartshorn, *any quantity;* put it into a retort, and distil with a gradually raised heat, a volatile liquor, a salt, and an oil; then repeat the distillation of the volatile liquor until it becomes as limpid as water, separating, after each distillation, the oil and salt by filtration. The liquor will be more easily purified, if, after each distillation, except the first, there be added to it one-sixth part of its weight of charcoal, previously made red hot, then extinguished by covering it with sand, and powdered while hot. If a sufficient quantity of hartshorn cannot be procured, the bones of any land animals may supply its place."

In this process the gelatine of the horns, or the bones, is decomposed, and its ultimate principles, which are carbon, nitrogen (*azote*), hydrogen, and oxygen, entering into new combinations, form subcarbonate of ammonia, empyreumatic oil, and water, which are the products of the process. The subcarbonate is obtained partly in a solid form, and partly dissolved in the water, which distils over; but in both states it is contaminated with the empyreumatic oil. The subsequent distillations are intended to free it from this oil; which, although at one time it was supposed to add to the efficacy of the remedy, yet is now conceived to be useless, and a disadvantage: nevertheless, when it is completely removed by the charcoal, this preparation does not differ from a simple solution of the subcarbonate in water.

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[1] Alkali volatil fluor (*F.*) Wässrigter Kohlensaures Ammonium liquor (*G.*) Liquore dis corno di Cervo (*I.*)

The volatile liquor of hartshorn found in the shops is part of the product of the distillation of bones on a great scale; and is never completely free from the empyreumatic oil, which is very perceptible in its odour and taste, and gives it a slight yellow tinge. It is often adulterated by the addition of a considerable portion of water; and this cannot be known by its pungency, which is kept up by adding to it a small quantity of liquor ammoniæ. The fraud, however, may be detected by mixing a small portion of the suspected liquor with twice its bulk of alcohol; when, if no considerable quantity of salt is precipitated, it is certainly adulterated.

LI'QUOR POTASSÆ. Lond. *Solution of Potash.*[1]

"Take of subcarbonate of potash, *a pound;* lime fresh burnt, *half a pound;* boiling distilled water, *a gallon.* Dissolve the subcarbonate of potash in two pints of the water. Add the remainder of the water to the lime, mix the hot liquors together, then set the mixture aside in a covered vessel, and when it is cold, let it be strained through a cotton bag. If, on the addition of any diluted acid, effervescence be excited, more lime must be added, and the filtration repeated. A pint of this solution ought to weigh sixteen ounces."

AQUA POTASSÆ. Edin. *Water of Potash.*

"Take of lime fresh burnt, *eight ounces;* subcarbonate of potash, *six ounces;* boiling water, *twenty-eight ounces.* Let the lime be put into an iron or earthen vessel, with twenty ounces of the water. When the ebullition ceases, immediately add the salt, dissolved in the remaining eight ounces of the water; and having thoroughly mixed the whole, cover the vessel till they cool. The mixture being cooled, agitate it well, and pour it into a glass funnel, the tube of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel while its tube is inserted into another glass vessel, that the solution of potash may gradually drop through the linen into the lower vessel. When it first ceases to drop, pour a few ounces of water into the funnel, but cautiously, so that the fluid may swim above the matter. The water of potash will again begin to drop. The affusion of water, however, must be repeated until three pounds have filtered, which will be in the space of two or three days; then let the upper parts of the solution be mixed with the lower by agitation, and preserve it in a well stopt vessel.

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[1] Aqua Kali Puri, P. L. 1787. Dissolution de Potasse (*F.*) Flüssiges ätzendes Kali (*G.*) Liquore di Potassa (*I.*)

AQUA KALI CAUSTICA. Dub. *Water of Caustic Kali.*

"Take of lime fresh burnt, *eight ounces;* subcarbonate of kali, *six ounces.* Pour upon the lime put into an earthen vessel, two pints of boiling water; and when slacked, mix with it the salt, and cover the vessel. Pour the materials, as soon as they are cold, into a glass funnel, the tube of which is obstructed with a linen rag. Cover the funnel, and allow the lixivium to drop into a vessel placed below it, pouring water into the funnel occasionally, until three pounds have filtered. Let the solution be shaken, and preserved in a well-stopt green glass bottle.

"If the ley be rightly prepared it will be colourless, inodorous, and will scarcely effervesce when mixed with an acid. If it effervesce considerably, let a small portion of fresh burnt lime, in fine powder, be added; digest for twenty-four hours in a covered vessel, frequently agitating; and finally, filter the ley in the manner already directed.

"The specific gravity of this solution is, to that of distilled water, as 1100 to 1000."

In considering the proportions of the two latter of these processes, there appears, *a priori*, a much larger proportion of lime ordered than is necessary for the decomposition of the subcarbonate of potash; but if the theory of Berthollet[1], as to the effect of quantity in influencing chemical affinities, be just, this superabundance is necessary to insure the more perfect separation of the carbonic acid from the potash. If the lime, however, be well burnt, and recent, the solution is obtained almost perfectly free from carbonic acid, by the quantity ordered in the London formula; but, unless much care be taken to exclude the air during the filtration, it will be rapidly attracted from the atmosphere. Calico is the best substance for stopping the mouth of the funnel, and it should be supported on a rough pebble or siliceous stone, previously dropped into the funnel, and allowed to settle itself. It should be kept in small glass bottles, fitted with ground stoppers.

Qualities.—Solution of potash is inodorous, and so caustic as not to admit of being tasted. It is limpid, colourless, dense, and has an oily appearance when agitated; does not effervesce with acids, nor afford a precipitate with lime-water; and feels soapy when rubbed between the fingers, owing to the solution of the cuticle. When perfectly pure, it remains transparent on the addition of barytic water. Prepared according to the formulæ of the pharmacopœias, it is not a simple solution of potash, but contains small portions of muriate, and sulphate of potash, silica, and generally some lime[1]; but these contaminations do not alter its effects as a remedy, nor as a pharmaceutical agent.

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[1] *Chemical Statics*, vol. i.

Medical properties and uses.—This solution is diuretic, antacid, and lithrontiptic. The two first properties it certainly possesses in a considerable degree; but its continued use, even when much diluted, is said to debilitate, and otherwise injure the stomach. As a solvent of calculus, both in the kidneys and bladder, this alkali has long been celebrated: it acts, however, on calculi composed of uric acid, or of urate of ammonia, only; and although its continued use certainly renders the urine alkaline, yet there is reason to believe that its solvent effects on these calculi in the bladder are not equivalent to the irritation it excites both in the stomach and bladder; and as a prophylactic, its place can be much better supplied by magnesia and the alkaline carbonates. Dr. Willan says, he has seen the most beneficial effects experienced from the internal use of this solution in lepra.[2] It is also used as a local stimulant, much diluted, in the form of lotion, to the joints, in rachitis and gouty swellings; and in its concentrated state, as a caustic, to destroy the poison introduced by the bite of rabid or venomous animals.

The dose of this solution may be from ♏ x to f℥ſs, taken in chicken-broth, milk, or almond mixture; or, in cases of acidity of the stomach, in some bitter infusion.

Officinal preparations. *Potassa fusa.* L. E. D. *Potassa cum Calce.* L. E. D. *Liquor Sulphureti Kali.* D. *Antimonii Sulphuretum præcipitatum.* L. E.

LIQUOR POTASSÆ SUBCARBONATIS. Lond. *Solution of Subcarbonate of Potash.*[3]

"Take of subcarbonate of potass, *a pound;* distilled water, *twelve fluid ounces.* Dissolve the subcarbonate of potash in the water, and filter the solution through paper."

AQUA SUBCARBONATIS KALI. Dub. *Water of Subcarbonate of Kali.*

"Take of subcarbonate of kali, *any quantity;* let it be put into a wide-mouthed glass funnel, the neck of which is obstructed with a piece of linen; then set it in a cellar that the moist air may liquefy the salt. Let the ley or solution be received into a vessel placed under it."

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[1] The presence of muriates may be discovered by saturating a portion of the solution with nitric acid, then adding nitrate of barytes to precipitate the sulphates, if any; and lastly, adding a solution of nitrate of silver, which is precipitated if any muriate be present. Sulphates are discovered by saturating with muriatic acid, and adding muriate of barytes; and if lime be present, blowing into the solution through a tube will render it turbid.

[2] *Willan on Cutaneous Diseases,* p. 141.

[3] *Aq. Kali præparatum,* P.L. 1787. Dissolution de soucarbonate de Potasse (*F.*) Flüssiges Kohlensaures Kali (*G.*) Liquore di Sotto carbonato di Potassa (*I.*)

Of these two formulæ, that of the London College is to be preferred, as it affords the preparation with greater facility, and always of a definite strength. The bulk of the fluid is increased rather more than one third part. In the Dublin preparation, from the length of time which is required, the deliquescing salt attracts carbonic acid from the air, and becomes nearly a neutral carbonate.

Qualities. This solution should be perfectly clear, colourless, and inodorous; and possess the properties of the subcarbonate from which it is prepared. It cannot enter into extemporaneous formulæ with vegetable infusions containing much tannin, or with lime-water, magnesia, sulphate of magnesia, or the metallic salts; as these substances decompose it, or are decomposed by it.

Medical properties and uses.—These are the same as those of the concrete salt. The dose may be from ♏x to f℥j, in any convenient vehicle.

POTASSA CUM CALCE. Lond. *Potash with Lime.*[1]

"Take of solution of potash, *three pints;* lime, fresh burnt, *a pound.* Boil the solution of potash down to a pint, then add the lime, previously slaked by the water, and intimately mix them."

POTASSA CUM CALCE; olim, CAUSTICUM COMMUNE MITIUS. Edin. *Potash with Lime;* formerly, *Milder common Caustic.*

"Take of the water of potash, *any quantity.* Evaporate it to one third part in a covered iron vessel: then mix with it as much newly slaked lime as will bring it to the consistence of a solid paste, which is to be preserved in a well stopt vessel."

KALI CAUSTICUM CUM CALCE. Dub. *Caustic Kali with Lime.*

"Evaporate water of caustic kali to one third part; then add as much fresh burnt lime in powder as will form a mass of a proper thickness, which is to be preserved in a well-stopt bottle."

The addition of the lime in these preparations renders the potash less deliquescent, and consequently more manageable as an escharotic.

POTASSA FUSA. Lond. *Fused Potash.*[2]

"Take of solution of potash, *a gallon.* Evaporate the water in a clean iron vessel over the fire, until the ebullition having ceased, the potash melts, and then pour it out upon a clean iron plate into proper forms."

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[1] *Calx e Kali Puro*, P. L. 1778.

[2] Kali Purum, P. L. 1787. Potasse fondue (*F.*) Trocknes ätzendes Kali (*G.*) Pietra caustica (*I.*)

POTASSA; olim, CAUSTICUM COMMUNE ACERRIMUM. Edin. *Potash*; formerly, *Stronger common Caustic.*

"Take of solution of potash, *any quantity.* Evaporate in a covered very clean iron vessel, until, the ebullition being over, the saline matter flows smoothly like oil, which happens before the vessel becomes red hot. Then pour it out upon a clean iron plate; cut it into small masses before it hardens, and let it be preserved in well-stopt phials.

KALI CAUSTICUM. Dub. *Caustic Kali.*

"Take of solution of caustic kali, *any quantity.* Evaporate it over the fire in a clean iron vessel, until, the ebullition having ceased, the saline matter, on increasing the heat, remain almost quiescent in the vessel. Pour out the melted salt upon a clean iron plate; and while it is concreting, let it be cut into proper pieces, which must be immediately put into a phial closely stopt. During the evaporation the operator must avoid the drops which may be thrown out from the vessel."

The concrete potash procured by these processes is sufficiently pure for medical purposes, but it still contains the same foreign ingredients as the solution. To procure it as free as possible from carbonic acid, the evaporation should be performed very quickly, and in a deep vessel, so that the watery vapour which rises may exclude the atmospheric air. It is generally run into moulds, which form it into solid cylinders, which are covered with paper, and kept in well stopt bottles. The method of Berthollet[1] for obtaining it in perfect purity, which is usually described in chemical and pharmaceutical works, is too troublesome and expensive to be generally adopted. The following method proposed by Lowitz is more economical.

A solution of potash must be evaporated till a pellicle forms on its surface, then allowed to cool; and the saline deposit, which consists chiefly of the foreign salts, carefully separated. The evaporation is then to be renewed, skimming off the pellicles that form on the surface of the fluid, which, as soon as these cease to be produced, and the ebullition is ended, must be removed from the fire, and constantly stirred till it is cold. The mass is next to be dissolved in twice its weight of distilled cold water, the solution filtered, and evaporated in a clean iron or silver basin[2] until crystals are deposited. If the heated fluid consolidates into a mass, in any degree, a small portion of water must be added, and the mass again heated to fluidity. The supernatant liquor is left of a brown colour, which, after being kept for some time at rest in well-stopt phials, deposits the colouring matter, and may be again evaporated and crystallized as before. The crystals obtained in the various evaporations are colourless pure potash.[1]

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[1] *Journal de Physique*, xxviii. 402.

[2] Lowitz orders the evaporation to be performed in a glass retort; but pure potash, when hot, dissolves glass.

Qualities.—Concrete potash is a white brittle substance, having the peculiar odour of slacking quick-lime, and a degree of causticity which prevents it from being tasted. It attracts water rapidly from the atmosphere, and is completely soluble in less than its own weight of that fluid at 60°. When heated to 360° it melts, and at a red heat heat is volatilized. It unites with sulphur, the acids, many of the metallic oxides, and the fixed oils. Its constituents, according to the analysis of Sir H. Davy, who first ascertained its compound nature, are, in 100 parts, 86 of a metal which has been named potassium, and 14 of oxygen.[2]

Medical properties and uses.—Concrete potash is used only as an escharotic, for forming issues in diseases of the hip joint, the spine, and in deep-seated inflammations. It erodes the skin and soft parts beneath it to a certain extent, destroying the life of the part, which is subsequently thrown off as a slough, and an ulcer is left. To prevent inconvenience from its deliquescent nature, the skin should be covered with a piece of calico, spread with adhesive plaster, and having a hole in its centre sufficient to bare the part only where it is intended to apply the caustic. It has lately been much recommended for the removal of strictures of the urethra.

POTASSÆ ACETAS. Lond. *Acetate of Potash.*[3]

"Take of subcarbonate of potash, *a pound and a half; (diluted)* acetic acid, *a gallon.* Mix them together in a large glass vessel; and having evaporated the solution to one half over the fire, add gradually as much more (*diluted*) acetic acid as may be required for perfect saturation. Let the solution be again evaporated to one half, and strained; then let the evaporation be continued in a water-bath, so that, on being removed from the fire, crystals shall form."

ACETAS POTASSÆ. Edin. *Acetate of Potash.*

"Take of very pure carbonate of potash *one pound; weak* acetic acid, *a sufficient quantity.* Boil the subcarbonate in five pounds of the acid; and add more acid at different times, until the watery part of the former portion being nearly dissipated by evaporation, the acid newly added occasions no effervescence, which will be the case when about twenty pounds of acid have been consumed; then evaporate slowly to dryness. Liquefy this impure salt with a gentle heat for a short time; then let it be dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered fluid will be limpid; but otherwise, of a brown colour. Afterwards evaporate this fluid in a shallow glass vessel, so that when removed from the fire, it may pass into a crystalline mass. Finally, the acetate of potash ought to be preserved in closely shut vessels."

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[1] *Nicholson's Journal*, 4to, i. 164.

[2] *Phil. Trans.* 1808.

[3] Kali acetatum, P.L. 1787. Acetate de Potasse (*F.*) Essigsaures Kali (*G.*) Acetato di Potassa (*I.*)

ACETAS KALI. Dub. *Acetate of Kali.*

"Take of subcarbonate of kali, *any quantity*. Add to it at different times about five times its weight of distilled vinegar moderately heated. When the effervescence shall have ceased, and the fluid is somewhat evaporated, add, at intervals, more distilled vinegar, until the mixture entirely cease to effervesce: then evaporate to dryness, and having raised the fire a little, cautiously liquefy the mass. Dissolve the salt in water after it is cold; filter the solution, and let it be boiled, until, on being removed from the fire, it concretes into a crystalline mass, which should be very white. Put this mass, at the moment, into closely stopped bottles."

In these processes, the acetic acid of the distilled vinegar combines with the potash of the subcarbonate, and expels the carbonate acid in a gaseous form, exciting effervescence. Owing to the largely diluted state of the acid in distilled vinegar, a considerable quantity, nearly three times more than is ordered by the London College, is required to saturate the potash. Towards the point of saturation, the solution acquires a reddish-brown colour, and during the evaporation a quantity of carbonaceous matter is deposited, arising from the distilled vinegar, retaining some of the extractive of the common vinegar; or if the liquor be evaporated to dryness, a brownish-coloured salt is obtained. The filtering the evaporated fluid, or disfusing the salt, and keeping it for a little time fluid, then dissolving it in water, and filtering it, frees it almost entirely from colour, and a light carbonaceous matter remains on the filter. The filtered solution is nearly limpid and colourless; and when again evaporated forms a nearly colourless salt.[1] It is rendered still more colourless, if a portion of animal charcoal be added to the solution.[2]

This salt may also be prepared with the residue after the distillation of vinegar; but the process is not more economical than when distilled vinegar is used.

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[1] A very pure and beautiful salt, but too expensive for common use, may be prepared by adding to a solution of two parts of superacetate of lead, a solution of one part of subcarbonate of potash, and after filtering the liquor, adding to it a small portion of sulphate of potash, and filtering again before evaporation. Vide *Journ. de Pharm.* Maii, 1818. p 203.

[2] *Ann. de Chim.* vol. lxxxvi. p. 44.

Qualities. — Acetate of potash has a slight peculiar odour, and a warm sharp taste. It is usually in white masses, of a foliated soft texture, shining, and becoming soon moist if exposed to the air. One fluid ounce of distilled water at 60° dissolves 504 grains; or 100 parts of it are soluble in 105 parts of water, and in twice its weight of alcohol. It is sometimes adulterated with tartrate of potash, which may be detected by adding to a solution of the salt a solution of tartaric acid, which, if tartrate of potash be present, will occasion a copious precipitate. The same adulteration may be detected by the acetate of lead forming a precipitate, soluble in acetic acid. In the watery solution it is spontaneously decomposed; and is also decomposed by the strong acids; by a decoction of tamarinds; the sulphates of soda and of magnesia; the muriate of ammonia; the tartrate of potash and soda; and by solutions of oxymuriate of mercury, and of the nitrate of silver: which consequently cannot enter into formulæ with it.

Its constituents, according to the experiments of Dr. Higgins, are 38·5 of acid, and 61·5 of alkali—in 100 parts.[1]

Medical properties and uses. — Acetate of potash is mildly cathartic and diuretic. It is found to be occasionally beneficial in febrile affections and jaundice; but its principal use is in dropsies, and other diseases in which a copious discharge of urine is required. To produce the latter effect, the dose may be from ℈j to ʒj, given every three or four hours, in any bland fluid. Doses of ʒij or ʒiij open the bowels.

Officinal preparations. *Acetas Hydrargyri.* E. D. *Tinctura Acetatis Ferri.* D. *Acidum aceticum.*

POTASSÆ CARBONAS. Lond.[2] *Carbonate of Potash.*

"Take of subcarbonate of potash prepared from tartar, *a pound*; sub-carbonate of ammonia, *three ounces*; distilled water, *a pint*. To the solution of the potash in the water, add the carbonate of ammonia; next expose it in a sand-bath to a heat of 180° for three hours, or until the ammonia be expelled, and then set it aside to crystallize. Let the residuary fluid be evaporated in a similar manner, so that when set aside it may again afford crystals."

CARBONAS POTASSÆ. Edin. *Carbonate of Potash.*

"Take of pure subcarbonate of potash, *two parts*; water *three parts*. Dissolve the salt in the water, and by means of a proper apparatus, throw into it a stream of carbonic acid gas. Filter the solution, when it ceases to absorb the acid, and then evaporate it by a heat not exceeding 180°, that crystals may form. The carbonic acid is easily obtained by pouring diluted sulphuric acid on pulverized carbonate of lime."

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[1] *Higgins on Acetous Acid*, p. 8.

[2] Carbonate de Potasse (*F.*) Kohlensaures Kali (*G.*) Carbonato di Potassa (*I.*)

In the London process, which was first proposed by Bergman[1], the degree of heat employed aids the superior affinity of the potash for carbonic acid, while it weakens that of the ammonia, which therefore parts with the portion it contains to the subcarbonate of potash, and is itself volatilized. By following the directions of the formula it is an expensive process, unless the mixture be made in a retort, and a receiver containing a small portion of distilled water be adapted, so as to condense the pure ammonia which is volatilized: but in either way some of the ammonia still remains unexpelled; and the quantity ordered is not sufficient for yielding enough of the acid to fully saturate the potash. A purer and more completely neutralized carbonate of potash is obtained with equal facility by the Edinburgh process.[2] When prepared in this manner, any silex the subcarbonate may have contained, is completely separated.

Qualities.—This salt prepared by these formulæ, is, properly speaking, a bicarbonate. It has a slightly alkaline taste, without any acrimony. It is in small tetrahedral rhomboidal prisms, with dihedral summits, of a beautiful white colour, not altered by exposure to the air, soluble in four parts of water at 60°, and $\frac{5}{6}$ths of their weight of boiling water, in which they are partially decomposed, carbonic acid gas being emitted during the solution. It still changes to green the vegetable blues, and is therefore in strict language not a carbonate. Its constituents, according to Pelletier, are 43 acid, 41 of alkali, and 16 of water—in 100 parts.[3]

Medical properties and uses.—On account of the increased quantity of carbonic acid which this salt contains, it is preferable to the common subcarbonate for effervescing draughts; but does not differ from it in its properties as a remedy.

POTASSÆ SUBCARBONAS. Lond. *Subcarbonate of Potash.*[4]

"Take of impure potash (*pearl-ashes*), reduced to powder, *three pounds;* boiling water, *three pints and a half.* Dissolve the potash in the water, and filter; then pour the solution into a clean iron pot, and evaporate the water with a gentle heat until the liquor thickens; lastly withdraw the fire, and stir assiduously with an iron spatula, until the salt concretes into small grains."

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[1] *Opusc.* i. 13.

[2] Another method is recommended by Curadau: "He dissolves the potash in a sufficient quantity of boiling water, mixes it with as much tanner's bark as to make it pretty dry, and then exposes the mixture, in a covered crucible. to the heat of a reverberatory furnace for half an hour. By lixiviation and crystallization the mixture affords permanent crystals of carbonate of potash." *Edin. New Dispensatory*, 452.

[3] *Ann. de Chim.* t. xv. p. 33.

[4] *Kali præparatum*, P. L. 1787. Sou-carbonate de Potasse (*F.*) Kohlensaures Kali (*G.*) Sotto-carbonato di Potassa (*I.*)

"A purer subcarbonate of potash may be prepared in a similar manner from Tartar, previously burnt until it is of an ash colour."

SUBCARBONAS POTASSÆ. Edin. *Sub-carbonate of Potash.*

"Let impure carbonate of potash be put into a crucible and exposed to a red heat. Then triturate it with an equal weight of water. Pour the solution, after the impurities have subsided, into a clean iron pot, and boil it to dryness; stirring the salt constantly towards the end of the boiling, to prevent it from adhering to the vessel."

SUBCARBONAS KALI. Dub. *Subcarbonate of Kali.*

"Take of potashes coarsely powdered, cold water, each *six pounds.* Mix them by trituration, and macerate them in a wide vessel for the space of a week, with frequent agitation; then filter the solution, and evaporate it to dryness; and towards the end of the process assiduously stir the saline mass with an iron spatula. In this manner having reduced it to a coarse powder, preserve it in well stopt vessels. Previous to dissolving the ashes in the water, if they be very impure, roast them in a crucible until they become white."

The potash of commerce is a heterogeneous mass, consisting chiefly of subcarbonate of potash, with small portions of sulphate of potash, muriate of potash, siliceous earth, oxide of iron, and oxide of manganese, in various proportions. (See *Part* ii. p. 318.) The above processes are intended to separate the subcarbonate of potash in as pure a state as possible; and by following the directions of any of the pharmacopœias, it is obtained sufficiently pure for medicinal purposes; while the insoluble metallic salts, and the greater part of the siliceous earth, are left on the filter when the solution is strained. It may be obtained in a still purer state by evaporating the solution till a pellicle forms on the surface, and allowing it to stand for some hours, in order that the muriate of potash and the sulphate of potash may be crystallized and separated; after which the solution of the subcarbonate can be evaporated, and treated as above.

Qualities.—The salt obtained by the above processes is a subcarbonate in coarse white grains, which, owing to the excess of alkali, are so deliquescent, that they soon attract from the air as much water as dissolves them; and hence the salt must be kept in well stopt bottles. Its taste is acrid and urinous; it changes to green the vegetable blue and red colours, combines with oils, and forms soaps, and is decomposed by acids with effervescence. Its constituents, according to Kirwan, are, in 100 parts, 60 of potash, 28 or 30 of carbonic acid, 6 of water, and the remainder sulphate of potash, muriate of potash; siliceous earth, and argil.[1]

SUBCARBONAS POTASSÆ PURISSIMUS.[2] Edin. *Pure Subcarbonate of Potash.*

"Take of impure supertartrite of potash, *any quantity.* Wrap it up in moist bibulous paper, or put it into a crucible; and having placed it among live coals, let it be burnt to a black mass; which, after having reduced it to powder, expose in an open crucible to a moderate fire, until it become white, or at least ash-coloured, taking care that it be not melted. Then dissolve it in warm water; strain the solution through a linen cloth, and evaporate it in a clean iron vessel, stirring constantly towards the end of the process with an iron spoon, lest any of it should adhere to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes red hot. Finally, when it is cold, let it be preserved in well stopt glass vessels."

KALI E TARTARO. Dub. *Kali from Tartar.*

"Take of crystals of tartar, *any quantity.* Heat it to redness in a silver crucible lightly covered, until fumes cease to be emitted. Let the residue be reduced to a coarse powder, and in the same crucible left uncovered, roast it for two hours, stirring it frequently. Then boil it in twice its weight of water, during a quarter of an hour; and after due subsidence of the impurities, pour off the pure solution. Let this part of the process be three times repeated. Filter the mixed leys, and evaporate them in a silver vessel; then, while the residuary salt is drying, granulate it by brisk agitation, and expose it to an obscure red heat. Take it out of the vessel before it be quite cold, and let it be preserved in well stopped phials."

The product of these processes is a subcarbonate of potash. The degree of heat to which the crude supertartrate is exposed decomposes its tartaric acid; and by the re-union of two of its components, oxygen and carbon, carbonic acid is formed, which combines with the potash, while the remaining carbonaceous matter produced by the decomposition is burnt out by the subsequent roasting. The resulting saline mass, besides subcarbonate of potash, contains also a small portion of carbonate of lime and some argil, which however are separated by the solution and filtration.

Qualities.—These are in every respect the same as those of the salt obtained from the potashes of commerce; it, however, contains fewer impurities. Its constituents, according to Berard, are 29·79 acid, and 70·21 alkali and water, in 100 parts.[1]

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[1] *Nicholson's Journal,* 4to. iii. 215.

[2] Soucarbonate de Potasse (*F.*) Sotto carbonato di Potassa (*I.*)

Subcarbonate of potash is often adulterated, or very carelessly prepared. If one part of it be dissolved in eight parts of distilled water and saturated with pure nitric acid, the presence of siliceous earth will be indicated by the solution becoming turbid, and by weighing the precipitate its quantity may be ascertained. A precipitate being formed on the addition of muriate of barytes indicates the presence of sulphates; a white precipitate turning blueish on exposure to the light, on adding nitrate of silver, proves the presence of muriatic salts; and calcareous earth is rendered evident by dropping into a solution of the subcarbonate a few drops of a solution of oxalic acid or oxalate of ammonia.

Medical properties and uses.—Subcarbonate of potash is deobstruent, diuretic, and antacid. In small doses, it is sometimes given in cases of glandular obstructions of the abdominal viscera, particularly hepatic obstructions, with seeming advantage; but it is not certain that the benefit does not arise from the effects of the remedy in correcting acidity of the primæ viæ. Its effects on the kidneys are considerable, when aided by plentiful dilution. The principal use, however, of this salt in medicine, is for the formation of saline draughts, for which purpose it is given in combination with a solution of citric acid, or with recent lemon juice, in the proportion of ℈j of the salt to f℥iv of the lemon juice, or the acid solution, in febrile affections. When given as an antacid, its taste and acrimony are most perfectly covered with milk.

Officinal preparations. *Aqua Supercarbonatis Potassæ.* E. *Potassæ Acetas.* L. E. D. *Potassæ Carbonas.* L. *Potassæ Tartras.* L. E. D. *Liquor Potassæ.* L. E. D. *Liquor Potassæ Subcarbonatis.* L. D. *Sulphas Potassæ.* E. *Magnesiæ Carbonas,* L. D. *Potassæ Sulphuretum.* L. E. D. *Liquor arsenicalis,* L. *Sulphur antimoniatum fuscum.* D. *Alcohol.* L.

POTASSÆ SULPHAS. Lond. *Sulphate of Potash.*[2]

"Take of the salt which remains after the distillation of the nitric acid, *two pounds;* boiling water, *two gallons.* Mix them so as to dissolve the salt; and then add as much subcarbonate of potash as may be sufficient to saturate the acid. Next boil till a pellicle forms on the surface, and after filtering the liquor, set it aside to crystallize. Pour off the water, and dry the crystals on bibulous paper."

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[1] *Annales de Chimie,* lxxi. 55.

[2] This name was imposed by the French chemists in 1787. The following are some of its old names: *Nitrum fixum, arcanum duplicatum, sal de duobus, sal polychrestus, tartarum vitriolatum, kali vitriolatum.*—*Syn.* Sulfate de Potasse (*F.*) Schwefelsaures Kali (*G.*) Solfato di Potassa (*I.*)

SULPHAS POTASSÆ. Edin. *Sulphate of Potash.*

"Dissolve the acidulous salt, which remains after the distillation of nitrous acid, in hot water, and add as much carbonate of lime in powder, as will saturate the superfluous acid, and leave the whole at rest, until the fæces subside. Having poured off the fluid, filter it through paper, and evaporate until crystals form."

SULPHAS KALI. Dub. *Sulphate of Kali.*

"Dissolve the salt which remains after the distillation of nitric acid, reduced to a powder, in a sufficient quantity of warm water. Add as much potash as will saturate the superfluous acid. Let the filtered solution be evaporated with a gentle heat, that crystals may be formed."

In these preparations, the subcarbonate of potash, and the carbonate of lime, which are added to the solution of the salt, combines with the superfluous sulphuric acid, while its carbonic acid is expelled; and the whole of the residue is thus converted into sulphate of potash. Both the London and the Dublin formulæ are objectionable on the score of expense; the value of the salt, as obtained by the London process, at the price of the pure salt made on the large scale, being to its cost very nearly as 5 to 10.[1] The greater part of the sulphate of commerce is prepared from the residue of the distillation of nitrous acid from nitre and sulphate of iron. This is a mixture of sulphate of potash and red oxide of iron, from which the sulphate is easily separated by boiling water, while the oxide remains undissolved.[2]

Qualities. — Sulphate of potash has a nauseous bitterish taste. It is usually procured in small, grouped, transparent crystals, of which the primitive form is a pyramidal dodecahedron, with isosceles triangular faces[3]; but this form is subject to various modifications, according to the mode of conducting the evaporation. Their specific gravity is 2·4073.[4] They are scarcely efflorescent; decrepitate when heated; and are soluble in 16 parts of water at 60°, and 5 parts of boiling water. This salt is partially decomposed by the nitric and muriatic acids; and in solution is completely decomposed by muriate of barytes, muriate of lime, lime-water, oxymuriate of mercury, nitrate of silver, and acetate and superacetate of lead, which therefore cannot enter into formulæ with it. Charcoal also decomposes it at a high temperature. Its constituents, according to the analysis of Mr. Phillips[5], are 45·79 of acid, 54·21 of alkali; that of Berzelius 45·0 of acid, and 55·0 of alkali; and that of Berard 42·76 of acid, and 57 24 of alkali.[1]

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[1] Vide *London Medical Review*, April 1810, p. 135.

[2] This, when dried, is of a deep red colour, and is the *colcothar* of commerce.

[3] *London Medical Review*, April 1810.

[4] Hassenfratz, *Ann. de Chimie*, xxviii. 12.

[5] *System of Chemistry*, 4th ed. ii. 660.

Medical properties and uses. — This salt is deobstruent and cathartic. It is given with great advantage in the visceral obstructions to which children are liable; and in combination with rhubarb or with aloes, I have found it more useful than any of the other saline purgatives in jaundice and dyspeptic affections. On account of its sparing solubility, it is generally given in the form of powder, in doses of from grains x to ʒj, according as it is intended to act as a deobstruent or purgative.

Officinal preparations. *Pulvis Ipecacuanhæ compositus.* L. E. D. *Pulvis Scammoniæ compositus.* L.

POTASSÆ SUPERSULPHAS. Lond. *Supersulphate of Potash.*

"Take of the remains after the distillation of the nitric acid, *two pounds*; boiling water, *four pints*. Mix them, that the salt may be dissolved, and filter. Then boil the solution till one half is dissipated, and set it aside to crystallize. Pour off the water, and dry the crystals on bibulous paper."

This salt is the *Sal enixum* of commerce. The solution should not be filtered until it be cold, as a copious deposition of uncrystallized salt takes place when it is filtered while hot.

The excess of sulphuric acid is so very loosely combined with sulphate of potash, that great part of it may be washed off by water; but nevertheless, the crystallized salt differs in several respects from the neutral sulphate.

Qualities. — Its crystals are long, hexangular prisms, impressing a sour and slightly bitter taste. It reddens the vegetable blues; is soluble in five parts of water at 60°; in less than an equal weight of boiling water; and effervesces with the carbonates of alkalies. The proportions of its constituents are stated to be, of potash 38, acid 62; but these are not accurately ascertained.

Medical use. — As a remedy its efficacy is as yet unknown; but we are informed[2] that it has been introduced into the pharmacopœia from an idea that it will afford "a useful means of producing the effects of sulphuric acid combined with those of an opening salt; and it may be exhibited at once in a solid form, an indication which is often desirable."

SULPHAS POTASSÆ CUM SULPHURE. Edin. *Sulphate of Potash with Sulphur.*

"Take of nitrate of potash in powder, and of sublimed sulphur, *equal weights*. Mix them well together, and throw the mixture in small quantities at a time into a red hot crucible. The deflagration being finished, let the salt cool, and preserve it in a well stopped glass vessel."

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[1] *Annales de Chimie*, lxxi. 47.

[2] *Powel's Translation of the London Pharmacopœia*, 2d ed. 73.

In this process the sulphur is oxidized, and converted partly into sulphuric acid, and partly into sulphurous acid, by uniting with the oxygen afforded by the decomposition of the nitric acid of the nitrate, which is effected by the degree of heat employed. During the deflagration, however, a part of the acid is volatilized in the form of nitrous oxide, and consequently the oxygen evolved is not sufficient to acidify all the sulphur, and the unaltered portion remains united with a portion of potash. The sulphuric and sulphurous acids combine with the remainder of the potash; and hence the product is a mingled mass, consisting of sulphate or supersulphate of potash; sulphate of potash; and sulphuret of potash.

Qualities. — This salt has a sensibly acid taste, and reddens infusion of litmus. It is almost wholly dissolved in eight parts of water at 60°; and by exposure to the air it is altogether converted into sulphate of potash. In general I have found that it emits no sulphureous odour on the addition of sulphuric acid, and is not precipitated by acids; but in other specimens prepared with equal care sulphur was thrown down by the muriatic acid.

Medical properties and uses. — The same as those of sulphate of potash; and consequently it is scarcely ever used.

AQUA ALCALINA OXYMURIATICA. Dub. *Oxymuriatic alkaline Water.*

"Take of muriate of soda dried, *two pounds;* manganese in powder, *a pound;* water, sulphuric acid, each *two pounds.* Mix together the muriate of soda and manganese, put them into a matrass, and add the water; then, by means of a proper apparatus, add gradually, and at intervals, the sulphuric acid; and transmit the disengaged gas through a solution consisting of *four ounces* of (*sub*) carbonate of kali, and *twenty-nine ounces* by measure of water. Towards the end of the operation apply a moderate heat to the matrass. The specific gravity of this solution is to that of distilled water as 1087 to 1000."

For this process Woulfe's apparatus is necessary; two-thirds of the alkaline solution being put into the second bottle, and the remainder into the third. The sulphuric acid in the matrass unites with the soda of the muriate, and disengages the muriatic acid; which receiving oxygen from the black oxide of manganese is converted into oxymuriatic acid, and passes over in the gaseous form into the alkaline solution, where it unites with the potash of the subcarbonate, and sets free the carbonic acid in an elastic state. To prevent the inconvenience likely to result from the extrication of the carbonic acid gas, a solution of lime should be put into the last bottle of the range of receivers. The product in the receivers is a solution of oxymuriate of potash, containing some uncombined oxymuriatic acid; what remains in the matrass is a mixed sulphate of soda and of manganese. When the alkaline solution is stronger, in the proportion of ℥xvj of the subcarbonate to Oiv of water, a sparingly soluble crystallized salt is procured, which is regarded as a hyperoxymuriate of potash, and is a more certain preparation than the solution.

Qualities. — This solution has in a slight degree the odour of oxymuriatic acid, and a cooling taste. It destroys the vegetable colours, owing to the excess of acid it contains.

Medical properties and uses. — Oxymuriate of potash is stimulant and diuretic. The supposition which prevailed, that the effects of the nitric acid in syphilis arose from its imparting oxygen to the system, brought forward this preparation as a remedy in the same disease; and its use was soon extended to scurvy and other complaints which were supposed to depend on a deficiency of oxygen. But although it evidently has the power of checking for a time the action of the syphilitic virus, yet it has scarcely in any case succeeded in effecting a cure; and consequently it has fallen into disrepute, and is now seldom employed in any case.

POTASSÆ TARTRAS. Lond. *Tartrate of Potass.*[1]

"Take of subcarbonate of potash, *sixteen ounces*; supertartrate of potash, *three pounds*; boiling water, *a gallon*. Dissolve the subcarbonate of potash in the water, and add the supertartrate of potash reduced to powder till the effervescence ceases. Filter the solution through paper; then boil it until a pellicle appears on the surface, and set it aside to crystallize. Having poured off the water from the crystals, dry them on bibulous paper."

TARTRAS POTASSÆ; Edin. *Tartrate of Potash.*

"Take of subcarbonate of potash, *one part*; supertartrate of potash, *three parts*, or *a sufficient quantity*; boiling water, *fifteen parts*. To the subcarbonate dissolved in the water add in small portions the supertartrate of potash, reduced to a fine powder, as long as it excites effervescence, which gradually ceases before three times the weight of the subcarbonate of potash be added; filter the solution when it is cold, and after due evaporation set it aside that crystals may form."

TARTRAS KALI. Dub. *Tartrate of Kali.*

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[1] *Kali Tartarizatum*, P. L. 1787. Tartrate de Potasse (*F.*) Weinsteinsaures Kali (*G.*) Tartrato di Potassa (*I.*)

"Take of subcarbonate of kali, *a pound*; crystals of tartar reduced to a very fine powder, *two pounds and a half*, or *a quantity sufficient to saturate the kali*; boiling water, *a gallon*. To the subcarbonate of kali dissolved in the water gradually add the tartar; filter the solution through paper, evaporate, and set it aside that crystals may form as it cools."

In these processes the superabundant acid of the supertartrate of potash is saturated by the potash of the subcarbonate, and a neutral tartrate obtained. The quantity of alkali required for this purpose must necessarily vary, owing to the degree of dryness of the subcarbonate employed. To obtain regular crystals, a very slow nearly spontaneous evaporation is necessary: and, therefore, this salt as found in the shops, and prepared on a large scale, is in the form of a white granular powder, which is produced by the evaporation being continued to dryness with frequent stirring.

Qualities. — This salt has a bitterish cool taste. Its crystals are tetrahedral prisms, terminated by dihedral summits; and in this state it is soluble in its own weight of water at 60°; but in the granular form, four parts of cold water are required for its solution. When long kept in solution, its acid is decomposed, and its alkali remains in the state of a subcarbonate.[1] Alcohol also dissolves it readily. It is partially decomposed by even the weaker acids and acidulous solutions, as of tamarinds and other acid fruits, which reduce it to the state of supertartrate; and it is completely decomposed by lime-water, muriate of barytes, magnesia, nitrate of silver, and acetate and superacetate of lead. Its constituents, abstracting the water of crystallization, are, in 100 parts, 58·69 of acid, and 41·31 of alkali.[2]

Medical properties and uses. — Tartrate of potash is a valuable purgative, operating easily and without griping; and even correcting the griping properties of some other substances, as of senna and the resinous purgatives, with which it is, therefore, usually combined. The dose is from ʒj to ℥j in solution.

AQUA SUPERCARBONATIS POTASSÆ. Edin. *Water of Supercarbonate of Potash.*

"Take of water, *ten pounds*; pure subcarbonate of potash, *one ounce*; dissolve, and expose the solution to a current of carbonic acid gas arising from carbonate of lime in powder, *three ounces*; sulphuric acid, *three ounces*; and water, *three pounds*; gradually and cautiously mixed. The chemical apparatus of Dr. Nooth is well adapted for this preparation. But if a larger quantity of the solution be required, an apparatus which will admit of a sufficiently great pressure should be employed. The solution must be preserved in well stopt vessels.

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[1] *Murray's Chemistry*, 2d. ed. iv. 329.

[2] *Berzelius.*

This water is seldom sufficiently impregnated with the acid, when made on a small scale; but in the great way, and with an apparatus from which a much greater pressure is obtained, a solution is prepared for sale which contains a very large quantity of uncombined carbonic acid.

Qualities.— When properly prepared, this solution has a pungent, acidulous taste, and reddens tincture of litmus; is perfectly transparent, sparkles when poured into a glass, and effervesces violently with all the acids.

Medical properties and uses.—This solution is tonic, diuretic, and antacid. It has also been regarded as a lithontriptic, and is much used in calculous cases: but its properties as a solvent of calculi, if it possess any, must depend upon the potash it contains, and, hence, the more completely it is impregnated with carbonic acid, the more its lithontriptic powers must be diminished. There is, however, reason for believing, that even pure potash when taken into the stomach exerts no influence on ready-formed calculi, and consequently its operation, even as a palliative or preventive, is confined to the stomach, where it neutralizes the acid that always prevails there in calculous affections, and relieves many of the uneasy symptoms it occasions. In this view, the solution of the supercarbonate is a grateful mode of exhibiting potash, as its acrimony is destroyed by its combination with the acid, which is nevertheless so weak as not to interfere with its operation as an alkali. On the same principles it proves beneficial in dyspepsia and gout, and forms with lemon juice an effervescing draught still preferable to that prepared with the carbonate. The dose in calculous affections is f viij, taken three or four times a day.

SODA TARTARIZATA. Lond.[1] *Tartarized Soda.*

"Take of subcarbonate of soda, *twenty ounces*; supertartrate of potash in powder, *two pounds*; boiling water, *ten pints*. Dissolve the subcarbonate of soda in the water, and add gradually the supertartrate of potash. Filter the solution through paper; then boil till a pellicle forms on the surface, and set it aside to crystallize. Pour off the water from the crystals, and dry them on bibulous paper."

TARTRAS SODÆ ET POTASSÆ. Edin. *Tartrate of Soda and Potash.*

"Take of subcarbonate of soda, *one part*; supertartrate of potash, *three parts*, or *a sufficient quantity*; boiling water, *fifteen parts*. To the subcarbonate dissolved in the water, gradually add the supertartrate rubbed to a fine powder, as long as effervescence is excited, which generally occurs before three times the weight of the subcarbonate is added: when the fluid is cold, filter it through paper, and after a proper degree of evaporation, set it aside, that crystals may form."

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[1] Tartrate de Soude et de Potasse (*F.*) Natrum-weinstein (*G.*) Tartrato di Pottassa e di Soda (*I.*)

TARTARUS SODÆ ET KALI. Dub. *Tartrate of Soda and Kali.*

"Take of carbonate of soda, *twenty ounces;* crystals of tartar, reduced to a very fine powder, *two pounds;* boiling water, *ten pints.* Dissolve the carbonate of soda in the water, and gradually add the tartar; filter the solution through paper; evaporate it, and set it aside, that, as it slowly cools, crystals may form."

In these processes the superabundant acid of the supertartrate is saturated by the soda of the subcarbonate, the carbonic acid of which is dissipated in the gaseous form; and a triple salt is obtained by the evaporation, instead of two distinct salts being formed from the different alkaline bases.

Qualities.—This salt has a bitter saline taste. Its crystals are large, regular, transparent, hard, rhomboidal, six-sided prisms; very slightly efflorescent, and soluble in five parts of water at 60°. It is decomposed by the strong acids, muriate of barytes, lime, and by a red heat. The constituents of 100 parts of this salt, according to Schulze, are 41·3 of tartaric acid, 14·3 of potash, 13·3 of soda, and 31·1 of water[1]: but, according to Vauquelin, they are, tartrate of potash, 54 parts, tartrate of soda 46 parts.

Medical properties and uses. — Tartrate of potash and soda is a cooling and not very unpalatable cathartic. It was introduced into practice by M. Seignette[2], an apothecary of Rochelle, and the preparation kept a secret until it was discovered and published by Boulduc and Geoffrey in 1731. It operates moderately, and without exciting much irritation; hence it is well suited to nephritic and puerperal cases. The dose is from ℥j to ℥jſs, dissolved in any convenient vehicle.

SODÆ CARBO'NAS. Lond.[3] *Carbonate of Soda.*

"Take of subcarbonate of soda, *a pound;* subcarbonate of ammonia, *three ounces;* distilled water, *a pint.* To the solution of the subcarbonate of soda in the water, add the ammonia; then expose the mixture in a sand-bath to a heat of 180° for three hours, or until the ammonia be expelled; finally, set it apart to crystallize. The residuary liquor may be evaporated in the same manner, and set apart again to crystallize."

In these processes the subcarbonate of soda is nearly neutralized by the action of the same affinities as are exerted in the formation of the carbonate of potash.

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[1] *Gehlen Journ.* iv. 210. *Thomson's Chemistry*, 4th edit. iii. 96.

[2] Hence its appellations of *Sal de Seignette, Sal Ruppellensis.*

[3] Carbonate de Soude (*F.*) Kohlensaures Natrum (*G.*) Carbonato di Soda (*I.*)

CARBONAS SODÆ. Edin. *Carbonate of Soda.*

"Take of subcarbonate of soda, *two parts*; water, *three parts*. Dissolve the salt in the water, and subject it to a stream of carbonic acid gas, until the acid be no longer absorbed. Then filter the fluid and evaporate it in a heat not exceeding 180°, that it may crystallize. The carbonic acid form equal weights of pulverized carbonate of lime and sulphuric acid diluted with much water.

Mr. Phillips has remarked, that the proportion of the ammonia is too small by half an ounce to convert the subcarbonate of soda into bicarbonate of soda.[1] Although the soda is certainly not completely neutralized, as it still changes to green the vegetable blues; a defect which must be ascribed to the nature of the operation. The constituents of the neutral carbonate, according to Rose, are, in 100 parts, 49 of acid, 29·85 of alkali, and 20·20 of water. This salt does not appear to possess any advantages over the subcarbonate as a remedy, and may be therefore regarded as a redundant preparation.

SO'DÆ SUBCARBO'NAS. Lond.[2] *Subcarbonate of Soda.*

"Take of impure soda (*barilla*) in powder, *a pound*, boiling distilled water, *four pints*. Boil the soda in the water for half an hour, and filter the solution. Evaporate it to two pints, and set it apart that crystals may form. Throw away the liquor that remains."

SUB-CARBONAS SODÆ. Edin. *Subcarbonate of Soda.*

"Take of impure carbonate of soda, *any quantity*. Bruise it, and then boil it in water until all the saline matter be dissolved. Filter the solution through paper, and evaporate it in an iron vessel, so that after refrigeration crystals may form."

Dublin.

"Take of barilla in powder, *ten pounds*; water, *two gallons*. Boil the barilla in the water, in a covered vessel, for two hours, occasionally stirring; filter the liquor; then bruise the barilla that remains with an equal quantity of water, and again boil it: this may be repeated a third time. The leys being filtered and mixed, evaporate them to dryness in a wide iron vessel, taking care that the saline mass, which will remain, be not again liquefied by too great a heat: stir it with an iron spatula till it becomes white; finally dissolve it in boiling water, and, after due evaporation, set it apart, that, as it cools, crystals may form. These will be purer if the barilla before each boiling be exposed for some time to the air. The crystallization should be effected when the air is at the freezing temperature, and in a liquor the specific gravity of which is, to that of water, as

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[1] *Remarks on the Editio Altera*, p. 27.

[2] Natron Preparatum, P.L. 1787. Soucarbonate de Soude (*F.*) Sotto carbonato di Soda (*I.*)

1220 to 1000. If the salt be not very pure, repeat the solution and crystallization."

Barilla, besides the subcarbonate of soda, contains sulphate and muriate of soda, charcoal, lime, magnesia, argil and silex, from which these processes are intended to separate it. The earths being insoluble are separated by the solution and filtration; while the foreign salts remain dissolved in the residuary liquor after the subcarbonate of soda has crystallized. In the London formula, it has been justly observed[1], the evaporation is directed to be too soon stopped. One pound of barilla yields, when properly managed, from ℥iij to ℥v of the crystallized subcarbonate.

A pure subcarbonate of soda is now manufactured, on a great scale, by the decomposition of sulphate of soda, and of muriate of soda, which will probably supersede altogether the processes ordered in the pharmacopœias.[2]

Qualities. — Subcarbonate of soda has a mild alkalescent taste, and changes the vegetable blue and red colours to green. Its crystals are large transparent octohedrons, truncated at the summits of the pyramids, which effloresce when exposed to a dry air, and crumble down into a white opaque powder. It undergoes the watery fusion, at 150° Fah.; is soluble in two parts of water at 60°, and in considerably less than its weight of boiling water, its abundant water of crystallization assisting the solution of the salt at that temperature. Its constituents, according to the late analysis of D'Arcet[3], are, in 100 parts, 16·04 of acid, 20·85 of alkali, and 63·61 of water; but. Berard makes them to be 13·98 of acid, 23·33 of alkali, and 62·69 of water. By treating this salt in the method described under subcarbonate of potash, any muriates or sulphates it may contain are detected, while the tartaric acid, added to its solution, discovers potash, by forming a precipitate of the supertartrate.

Medical properties and uses. — This salt is antacid and deobstruent. It is less acrid than the subcarbonate of potash; and hence is in more general use in dyspepsia and acidities of the stomach and in scrophulous affections. Its use has been lately strenuously recommended in hooping-cough, the protraction of which it is said to prevent. It is given at first, after the stomach and bowels have been duly evacuated, in combination with ipecacuanha and opium, and afterwards, when the violence of the cough has abated, with myrrh or cinchona.[4] The dose of this salt is from grs. x, to ʒj, given twice or thrice a day.

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[1] *London Medical Review, April* 1808. 139.

[2] For experimental purposes, it is obtained, still purer from the crystallized acetate by ignition.

[3] *Annales de Chimie*, lxxi. 208.

[4] *Medico-Chirurgical Transactions*, vol. i.

Officinal preparation. *Sodæ Subcarbonas exsiccata.* L. D. *Sodæ Carbonas.* L. *Aqua Supercarbonatis Sodæ.* E. *Phosphas Sodæ.* E.D. *Soda tartarizata.* L. E. D.

SODÆ SUBCARBONAS EXSICCATA. Lond.[1] *Dried Subcarbonate of Soda.*

"Take of subcarbonate of soda, *a pound.* Expose the subcarbonate of soda to a boiling heat in a clean iron vessel, until it becomes perfectly dry, and at the same time stir it diligently with an iron spatula. Finally, rub it into a powder."

CARBONAS SODÆ SICCATUM. Dub. *Dried Carbonate of Soda.*

"Liquefy the crystals of carbonate of soda in a silver crucible over the fire; then, in an augmented heat, stir the dissolved salt until by the evaporation of the water it becomes dry. Reduce it to a fine powder, and preserve it in stopt phials."

Owing to the great proportion of water of crystallization this salt contains, it readily undergoes the watery fusion, and is completely dried by continuing the heat; but its properties are not otherwise altered. The constituents of 100 parts, in this state, according to the analysis of Kirwan, are 40·14 of acid, and 59·86 of soda[2], which nearly accords with the analysis of Dulong and Dalton.

Medical properties and uses. — The chief advantage obtained from drying the subcarbonate of soda is the facility of exhibiting it in the form of pills; for when the crystallized salt is used for this purpose, the pill formed with it falls to pieces as soon as the salt effloresces. Dr. Beddoes[3] has extolled it, in this form, as a remedy in calculous affections: and it certainly affords relief from the painful symptoms attending calculus in the kidneys, and other urinary affections: but its effects are palliative only; and depend on its destroying the prevalent acid in the stomach. The dose is from grs. x. to grs. xv., given three times a day. Beddoes directed it to be combined with soap and aromatics.

AQUA SUPER-CARBONATIS SODÆ. Edin. *Water of Super-carbonate of Soda.*

"Take of water *ten pounds;* subcarbonate of soda, *two ounces;* dissolve and subject the solution to a stream of carbonic acid gasprocured from *three ounces* of carbonate of lime, and the same quantity of sulphuric acid, with three pounds of water, gradually and cautiously mixed together. It may be conveniently prepared in Nooth's apparatus. But if a large quantity of it be required, an apparatus capable of affording a greater pressure will be requisite. The fluid must be preserved in well-corked bottles.

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[1] Soucarbonate de Soude sec (*F.*) Getrocknetes Kohlensaures Natrum (*G.*) Soto carbonato di Soda secco (*I.*)

[2] *Nicholson's Journal,* 4to. iii. 215

[3] *Beddoes on the Nature and Cure of Calculus.*

This preparation is milder and pleasanter than the water prepared with subcarbonate of potash. It is manufactured in large quantities on a great scale, of a much superior quality to any which the apothecary can prepare; and is in very general use as a cooling beverage. Half a pint of it poured over two table-spoonfuls of lemon-juice, sweetened with a little sugar, forms an excellent and very agreeable effervescing draught; and the same quantity poured upon two ounces of boiling milk forms an excellent substitute for asses' milk.

SO'DÆ SUL'PHAS. Lond.[1] *Sulphate of Soda.*

"Take of the salt which remains after the distillation of muriatic acid, *two pounds*; boiling water, *two pints and a half.* Dissolve the salt in the water; then add gradually as much subcarbonate of soda as will saturate the acid. Boil the solution until a pellicle appears, and after having filtered it set it apart to crystallize. Pour the water from off the crystals, and dry them on bibulous paper."

SULPHAS SODÆ. Edin. *Sulphate of Soda.*

"Dissolve in water the acidulous salt which remains after the distillation of muriatic acid, and having mixed with it carbonate of lime (*chalk*) in powder to remove the superfluous acid, set it apart until the impurities subside; then, having poured off the liquor, filter it through paper, and reduce it by evaporation, that crystals may be formed."

Dublin.

"Dissolve the salt which remains after the distillation of muriatic acid in a sufficient quantity of boiling water. Evaporate the filtered solution to a proper point, and set it apart, that, as it slowly cools, crystals may form.

The theory of the London process for preparing this salt is analogous to that of the process for preparing the sulphate of potash; but, from the low price of the salt, manufactured on a great scale (see *Part* ii.) it is preferable to saturate the superabundant acid with chalk, and reject the sulphate of lime. The salt obtained by the Dublin process has a slight acidulous taste, and contains a quantity of sulphuric acid, but so loosely combined as scarcely to entitle it to be regarded as a supersalt; nor do its crystals differ in form from those produced by the other two formulæ.[2]

Qualities.—The taste of this salt is at first simply saline, but afterwards very disagreeably bitter. Its crystals are transparent, six-sided, irregular, channelled prisms, with dihedral summits; efflorescent and rapidly fall to a white powder when exposed to the air. It is soluble in 2·86 parts of water at 60°, and 0·8 of boiling water; undergoes the watery fusion when heated, and in a strong heat is partially decomposed. According to Berzelius, 100 parts contain 24·64 of acid, 19·36 of alkali, and 56 of water; and in the dried state, according to Bulcholz, 54 acid, and 46 of alkali.[1]

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[1] Natron Vitriolatum, P. L. 1787. Sulphate de Soude (*F.*) Krystalisirtes Natrum (*G.*) Solfato di Soda (*I.*)

[2] The crystals of the supersulphate formed by dissolving the sulphate in sulphuric acid, and crystallizing, are rhomboidal.

Medical properties and uses.—Sulphate of soda is a very common and useful purgative; but from its nauseous taste it is not very generally prescribed by the physician. The dose is from ℥ſs to ℥ij, but in the effloresced state half of these quantities is sufficient.

PHOSPHAS SODÆ. Edin.[2] *Phosphate of Soda.*

"Take of bones, burnt to whiteness and reduced to powder, *ten pounds;* sulphuric acid, *six pounds;* subcarbonate of soda, a sufficient quantity of bones with the sulphuric acid in an earthen vessel; then add the water, and again mix: keep the vessel in a vapour-bath for three days; after which, dilute the matter with nine pounds more of boiling water, and strain through a strong linen cloth, pouring boiling water gradually over it until the whole of the phosphoric acid be washed out. Set the strained liquor apart that the impurities may subside, from which pour it off, and evaporate it to nine pounds. To this liquor separated from its impurities, and heated in an earthen vessel, add a warm solution of subcarbonate of soda, until the effervescence cease: then strain, and set the liquor aside that crystals may form. These being removed, add to the liquor, if necessary, a little subcarbonate of soda, that the phosphoric acid may be accurately saturated; and dispose it by evaporation again, to yield crystals, as long as these shall be produced. Finally, let the crystals be preserved in a well-closed vessel."

Dublin.

"Take of burnt bones reduced to powder, *five pounds;* sulphuric acid *three pounds and an half.* Mix the powder with the sulphuric acid in an earthen vessel; add, gradually, five pints of water, and agitate the mixture. Digest for three days, adding from time to time more water, lest the materials should become dry, and continue the agitation; then pour over them five pints of boiling water, and strain through a linen rag, pouring on, at intervals, boiling water, until all the acid be washed out. Set the liquor apart that the impurities may subside, from which decant it. and evaporate it to one half;

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[1] *Nicholson's Journal,* 4to. iii. 215.

[2] Phosphate de Soude (*F.*) Phosphorsaures Natrum (*G.*) Fosfato di Soda (*I.*)

then add three pounds ten ounces of carbonate of soda (dissolved in a sufficient quantity of warm water); filter, and obtain crystals by repeated evaporation and cooling. The crystals are to be preserved in well closed vessels.

"If the salt be not sufficiently pure, repeat the solution and crystallization."

When bones are burnt to whiteness, the residue is chiefly phosphate of lime, 100 parts of which consist of 41 parts of acid, and 59 of base[1], with a small portion of carbonate of lime. The addition of sulphuric acid, as directed in the above formulæ, abstracts 0·40 parts of the lime, so as to form an insoluble sulphate of lime, and, involved in its mass, a soluble superphosphate of lime, for the separation of which the digestion in vapour and the repeated effusions of boiling water are ordered. The soda of the subcarbonate of soda, which is added to the defecated and filtered solution, now unites with the superabundant phosphoric acid, by which means the lime is again left combined with as much of this acid only as renders it a neutral phosphate, which from its insolubility precipitates, and is easily separated from the phosphate of soda, which being soluble, remains dissolved in the water, and crystallizes on the subsequent evaporation of the filtered liquor.

There are some niceties in the manipulation of this process that require to be noticed. In the first place, if too much sulphuric acid be employed, sulphate of soda will be also produced; and as four parts only of sulphuric acid are required to decompose ten parts of phosphate of lime, both the above formulæ err in this particular: secondly, as the phosphate of soda does not crystallize well without an excess of base, a little more subcarbonate of soda must be added than is required simply to neutralize the excess of acid of the superphosphate: and lastly, the evaporation must not be carried quite to the formation of a pellicle, as in this case the crystallization is indeterminate, and the whole often concretes into an irregular mass.[2]

Qualities. — This salt has a purely saline taste, resembling very much that of common salt. Its crystals are large, regular, transparent, rhomboidal prisms, terminated by three-sided prisms, having a specific gravity of 1·333, efflorescing on exposure to the air. It is soluble in three parts of water at 60°, and in two parts of boiling water; and undergoes the watery fusion when heated. Its constituents, according to Thenard, are, in 100 parts, 19 of soda, 15 of phosphoric acid, and 66 of water; and according to Berzelius 20·33 of acid; 17·67 of base, and 62·80 of water. Muriate of barytes, lime, and magnesia, decompose this salt; and by the strong acids it is converted into superphosphate of soda.

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[1] Vauquelin.

[2] A cheaper mode of preparing this salt has been given by M. Funcke, a German chemist. He adds to the matter of calcined bones diffused in water, just enough dilute sulphuric acid to saturate the small portion of carbonate of lime it always contains. When the effervescence ceases, the whole is dissolved in nitric acid, and as much sulphate of soda added to the solution as of bone ashes used. The whole is then distilled to recover the nitric acid; and the phosphate of soda is separated from the residue, which is a mixture of sulphate of lime and phosphate of soda, by solution and crystallization.

Medical properties and uses. — Phosphate of soda is a mild cathartic, excellently adapted for children, and others who have a fastidious taste. It may be given dissolved in gruel, or broth, made without salt, by which its taste is very effectually covered. The dose is from ʒvj to ℥ij. It was introduced into practice by Dr. George Pearson of London.

MURIAS SODÆ SICCATUM. Dub.[1] *Dried muriate of Soda.*

"Take of muriate of soda, *any quantity.* Roast it over the fire in an iron vessel slightly covered, until it cease to decrepitate, occasionally agitating."

One hundred parts of crystallized muriate of soda contain, according to Kirwan, 8·12 of water, which is nearly dissipated by the heat; and the salt is thus rendered of a more uniform strength. It is employed chiefly for the distillation of muriatic acid, which is obtained colourless from the dried salt.

EARTHS AND EARTHY SALTS.

Earths possess peculiar properties, which distinguish them from other bodies, and constitute them a distinct class of natural productions. They are opaque, solid, uninflammable, of very difficult fusibility, very sparingly soluble in water, and of a specific gravity not exceeding 4·9. Some of them resemble the alkalies in several particulars; are caustic, change to green the vegetable blues and reds, and neutralize acids; and have therefore been denominated Alkaline Earths. Of this division three are medicinally employed; namely, Lime, Magnesia, and Barytes; but the two former only are used as remedies in their pure state. Those earths which do not possess alkaline properties are denominated Proper Earths; of which one only, Alumina, is a medicinal agent; and it is not used in its uncombined state.

Although some of the old chemists conjectured that the pure earths were metallic oxides, yet no direct proofs in support of the supposition were obtained, and they were generally supposed to be simple bodies, until the discoveries of Sir H. Davy revived the idea of their metallic nature.

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[1] Muriate de Soude sec (*F.*) Getrocknetes salzsaures Natrum (*G.*) Muriato di Soda secco (*I.*)

The action of the pure earths on the animal economy is very similar to that of the alkalies.

The EARTHY SALTS[1] are compounds of the acids with the pure earths, resembling the salts formed by the combination of acids with alkalies. Some of them are crystallizable, and soluble in water; others are nearly insoluble: some of them exert scarcely any action on the animal œconomy; while others are possessed of great activity, and produce very striking effects.

In extemporaneous prescription, it is absolutely necessary to avoid combining the earths or earthy salts with substances with which they form insoluble compounds.

The following Table shows the solubility of the above earths, and of the compounds which they form with acids.

PURE EARTHS.	Solubility in one part of Water.	ACIDS which, in combination with these Earths, form		
		Soluble Compounds.	Compounds scarcely soluble.	Insoluble Compounds.
Lime......	0·002	Nitric Muriatic Acetic Benzoic Malic	Sulphuric Boracic Succinic Tartaric	Oxalic Phosphoric Carbonic Arsenic
Magnesia	0·000	Sulphuric Phosphoric Nitric Muriatic Carbonic Acetic Benzoic Succinic Malic	Tartaric	Boracic Oxalic
Barytes...	0·050	Nitric Muriatic Acetic Benzoic Tartaric	Succinic Carbonic Citric	Sulphuric Oxalic Phosphoric Boracic Arsenic.
Alumina.	0·000	Sulphuric Nitric Muriatic Carbonic Acetic Benzoic Oxalic Tartaric	Boracic	Phosphoric Arsenic

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[1] We prefer the title *Earths and Earthy Salts* to that of *Earths and their Salts*, which

ALUMEN EXSICCATUM. Lond.[1] *Dried Alum.*

"Melt alum in an earthen vessel over the fire, and increase the heat until the ebullition cease."

Edinburgh.

"Melt the alum in an earthen or iron vessel, and let it be kept over the fire until it cease to boil: then rub it into a powder."

ALUMEN USTUM. Dub. *Burnt Alum.*

"Take of alum *any quantity*. Expose to the heat of a strong fire in an earthen vessel until it cease to boil."

In these processes the alum loses its water of crystallization; but if the heat be too great, its acid is partly expelled, and partially decomposed. According to Kirwan, alum desiccated at 700° loses more than half its acid. By our experiments, English alum lost 0·43 in a moderate heat, and 0·46 in a red; Levant alum, 0·41 in a moderate heat, and 0·44 in a red heat. Chaptal found that in a red heat alum of his own manufacture lost 0·67; Roman alum, 0·50; English, 0·47; and Levant alum, 0·40.

Qualities.— Dried alum has a more astringent taste than the crystallized salt. It is obtained in the form of a light, opaque, white, spongy, friable mass, 100 parts of which consist of 36·25 acid, and 63·75 alumina.

Medical properties and uses.— It is chiefly used as an escharotic to destroy fungus in ulcers; but has also been given internally to the extent of ℈j for a dose in cases of cholic, the pain of which it is said to allay, while at the same time it gently opens the bowels.

CA'LCIS MU'RIAS. Lond.[2] *Muriate of Lime.*

"Take of the salt which remains after the distillation of subcarbonate of ammonia, *two pounds*; water, *a pint*. Mix, and filter the solution through paper. Evaporate the liquor until the salt remains dry. Preserve it in a closely-stopped vessel."

Qualities.— Muriate of lime is inodorous, and has a disagreeable, bitter, acrid taste. It is soluble in half its weight of cold water, and to any extent in boiling water. It rapidly deliquesces in the air, and undergoes the watery fusion when heated. According to Dr. Marcet it is composed of 49 parts of acid and 57 of lime.

CALX. Lond. *Lime.*[3]

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is the title of this section in the London Pharmacopœia, for the same reason that we preferred the term *Neutral Salts* to that of *Alkaline Salts*.

[1] Sulfate d'Alumine Séc. (*F.*) Gebrannter Alaun (*G.*) Allume calcinato (*I.*)

[2] Muriate de Chaux (*F.*) Salzsaure Kalkerde (*G.*) Muriato di Calce (*I.*)

[3] Chaux (*F.*) Kalkerde (*G.*) Calce (*I.*) Calviva (*S.*)

"Take of limestone, *a pound.* Break it into small pieces, and expose it in a crucible to a very strong fire for an hour, or until the carbonic acid be so completely expelled, that on the addition of acetic acid no air bubbles are extricated.

"Lime may be made in the same manner from shells, after they have been washed in boiling water, and freed from all impurities."

Lime prepared on the great scale for the ordinary purposes of art is sufficiently pure for medicinal use; but for some pharmaceutical purposes it is required to be more completely burnt than is usually the case of that which is obtained from the kilns; and perhaps it is with this view that the above preparation has been ordered by the London College. It may, however, be observed, that neither of the substances ordered affords lime in a state of absolute purity; limestone frequently containing silex, alumina, magnesia, and marine shells; and a portion of phosphate of lime which is not decomposed by the fire. To obtain perfectly pure lime, dissolve white marble or clean oyster shells in diluted muriatic acid, and to the filtered solution add solution of ammonia as long as any precipitate falls; then filter again, and decompose the muriate by a solution of pure carbonate of potash; wash the precipitate, and expose it to violent heat in a platinum crucible, till it cease to lose weight. The result is pure lime.

Qualities. — Well prepared lime is of a white colour, moderately hard, and brittle. Its specific gravity is 2·3. Its taste is hot, pungent, and bitter; on animal matter it operates as a most powerful caustic; changes the vegetable blues to green, and is infusible. Water poured on it is absorbed with a hissing noise, much heat is evolved, and the lime swells, falls to pieces, and is then said to be slacked; in which state it readily combines with sulphur, forming a sulphuret, and is to a certain degree soluble in water. It appears to be a compound of a peculiar metal which has been named *calcium*[1], and *oxygen.*

Use. Lime in this state is chiefly employed for pharmaceutical purposes and for forming the solution.

Officinal preparations. *Liquor Calcis.* L. E. D. *Potassa cum Calce.* L.

CRETA PREPARATA. Lond.[2] *Prepared Chalk.*

"Take of chalk, *a pound.* Add a little water to the chalk, and triturate it to a fine powder. Throw this into a large vessel of water, stir it, and after a short interval pour off the supernatant turbid water into another vessel, and set it apart that the powder may subside: lastly, let the water be poured off, and dry the powder."

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[1] This metal has the colour and appearance of silver, is solid, four times heavier than water, absorbs oxygen, and burns brilliantly in the open air, and by being oxidized is converted into quicklime. *Phil. Trans.* 1808.

[2] Craie préparé (*F.*) Rein Kreide (*G.*) Carbonato di Calce preparato (*I.*)

CARBONAS CALCIS PRÆPARATUS. Edin. *Prepared Carbonate of Lime.*

" Let carbonate of lime, triturated to powder in an iron mortar, and levigated with a little water, on a porphyry stone, be put into a large vessel: then pour water upon it, which, after frequently shaking the vessel, is to be poured off loaded with the fine powder. The subtile powder which subsides, when the water remains at rest, is to be dried. Let the coarse powder which the water could not suspend be again levigated, and treated in the same manner."

CRETA PRÆPARATA. Dub. *Prepared Chalk.*

" Let it be triturated to powder in an earthen mortar, with the addition of a little water; then mix this with a sufficiently large quantity of water by agitation, and after a short interval, when the coarser particles have subsided, pour off the fluid. This may be frequently repeated, always previously triturating; and finally, collect the very fine powder, which after some time will subside, and dry it upon an absorbent stone, or paper."

By the suspension of the finer particles of the levigated chalk in water, they are reduced to a more impalpable form, and are more effectually separated from the coarser particles than could be accomplished by any other mechanical means; but the chalk is not freed from the foreign earths it generally contains, (see *Calx*, Part ii.) although it be sufficiently pure for medicinal use.

Medical properties and uses.— Chalk is antacid and absorbent. It is exhibited advantageously in acidities of the primæ viæ; and in diarrhœas, after all irritating matters have been removed from the bowels by previous evacuation. As an external application it is sprinkled over ulcers discharging a thin ichorous matter, which is thus absorbed by the chalk, and prevented from excoriating the neighbouring sound skin. In cases of burns it is applied in a similar manner, and a poultice laid over it, by which the skinning of the sore is much hastened.[1]

The dose of chalk is from grs. x. to ℈ij, or more.

Officinal preparations. *Mistura Cretæ.* L. E. *Hydrargyrus cum Creta.* L. *Pulvis Cretæ compositus.* L. E. *Pulvis opiatus.* E. *Trochisci Carbonatis Calcis.* E.

CRETA PRECIPITATA. Dub. *Precipitated Chalk.*

" Take of solution of muriate of lime, *any quantity.* Add to it as much (*sub*) carbonate of soda, dissolved in four times its weight of hot distilled water, as may be sufficient to precipitate the chalk. Wash the precipitate three times in a sufficient quantity of water; then collect it, and dry it on a chalk stone or on bibulous paper."

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[1] *Kentish on Burns,* passim.

A double exchange takes place in this process; the muriatic acid separates from the lime and unites with the soda, while the carbonic acid of the subcarbonate combines with the lime: the muriate of soda thus formed remains dissolved in the water, but the carbonate of lime is precipitated in the form of a white powder. It is an expensive preparation, and the benefit to be derived from a great degree of purity in this substance is not very obvious.

Officinal preparations. *Hydrargyrum cum Creta*. D. *Electuarium aromaticum*. D. *Mistura Cretæ*. D.

MURIAS BARYTÆ. Edin.[1] *Muriate of Barytes.*

"Take of carbonate of barytes, muriatic acid, each, *one part*; water, *three parts*. To the water and the acid mixed together add the carbonate broken into small pieces. The effervescence being finished, digest for an hour; then filter, and after due evaporation set the solution apart that crystals may form. Repeat the evaporation as long as any crystals are formed.

"If the carbonate of barytes cannot be procured, the muriate may be prepared from sulphate of barytes in the following manner:

"Take of sulphate of barytes, *two pounds*; charcoal in powder, *four ounces*; muriatic acid, a *sufficient quantity*. Roast the sulphate, that it may be the more easily reduced to a very fine powder, and mix it with the powder of charcoal. Put the mixture into a crucible, and having fitted to it a cover, let it be exposed to a strong fire for six hours; then, having well triturated the matter, put it into six pounds of boiling water, in a glass or earthen vessel, and mix by agitation, preventing, as much as possible, the action of the air.

"Let the vessel stand in a vapour-bath until the undissolved part shall have subsided, and then pour off the liquor. Pour upon the residue four pounds of boiling water, which, after agitation and subsidence, add to the former liquor: and then, while it is still hot, or, if it shall have cooled, after it is again heated, let muriatic acid be dropped into it as long as any effervescence is excited. Then let the solution be filtered and evaporated, that crystals may be formed."

The simplicity of the first of these processes, in which the superior affinity of the muriatic acid for barytes effects the decomposition of the carbonate, recommends its general adoption;

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[1] Muriate de Baryte (*F.*) Salzsaure Schwererde (*G.*) Muriato di Barita (*I.*)

and we believe this mineral can now be procured without difficulty, and in abundance. The second, however, may sometimes be required to be performed: it is somewhat complicated, but its theory is sufficiently obvious.

The charcoal, by the assistance of heat, decomposes the sulphuric acid of the sulphate of barytes, attracting its oxygen, and forming with it carbonic acid, which is dissipated in a gaseous form, while the sulphur remains united with the barytes. The boiling water added to this sulphuret dissolves it; but during the solution the water is partially decomposed, a portion of the sulphur attracts the oxygen of the decomposed water, and forming sulphuric acid, unites with a little of the barytes, so as to reproduce some sulphate which precipitates; while its hydrogen unites with another portion of the sulphur, and forms sulphuretted hydrogen, the combination of which, with the remaining sulphuret, converts it into a hydroguretted sulphuret, and prevents its further decomposition. Lastly, the muriatic acid added to the hot aqueous solution of these sulphurets decomposes them, disengages the sulphuretted hydrogen in the form of gas, and precipitates the sulphur; while at the same time it unites with the earth, and muriate of barytes remains in solution.

Several other methods have been proposed for the preparation of this salt, the following is that recommended by Bouillon La Grange.[1] Pulverise together equal parts of sulphate of barytes and muriate of lime; project the mixture into a red hot crucible, and let the fire be continued till the whole be melted, which is then to be poured out on a heated tile. After it is cold, reduce the mass to powder; boil it for some minutes in six times its weight of distilled water, and filter the solution: then evaporate the liquor to a pellicle, and set it aside to crystallize. The crystals require to be redissolved and again crystallized, to free them from any of the calcareous muriate they may retain on the first crystallization. The Edinburgh process, however, is still preferable to this of La Grange, as the previous calcination reduces any metallic salts that may be combined with the sulphate; and being thus rendered insoluble, they are separated during the first solution of the sulphuret.[2]

Qualities.—Muriate of barytes has an acrid, very nauseous, bitter taste. It crystallizes in grouped quadrangular tables, bevelled on the edges; transparent, white, and very brilliant; of a specific gravity of 2·8257: and not alterable from exposure to the air. When heated, it decrepitates, becomes opaque, and ultimately melts, but is not decomposed. One part requires three of water at 60° for its solution, and 2·20 of hot water. According to Berzelius, the constituents of 100 parts of this crystallized salt are 61·85 of barytes, 23·35 of muriatic acid, and 14·80 of water.[1] It is used only for forming the following solution:

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[1] *Annales de Chimie*, xlvii. 131.

[2] Goetling advises muriate of soda to be added to the charcoal, by which a smaller quantity of charcoal is capable of reducing a larger quantity of sulphate of barytes. A mixture of one part of muriate of soda and two parts of muriate of lime is sufficient to decompose six of the sulphate.

SOLUTIO MURIATIS BARYTÆ. *Edin.*[2] *Solution of Muriate of Barytes.*

"Take of muriate of barytes, *one part;* distilled water, *three parts.* Dissolve."

Qualities. — This solution possesses all the chemical and medicinal properties of the muriate. It is limpid, transparent, and colourless; but is rapidly decomposed by the earthy, metallic, and alkaline sulphates and nitrates; the alkaline phosphates, borates, and carbonates, being precipitated in the form of a white powder. Its affinity for sulphuric acid is so great, that, as a re-agent, it is capable of detecting 0.00009 of that acid in any fluid.

Medical properties and uses. — This solution is stimulant and deobstruent, and in large doses poisonous. It was introduced into practice by the late Dr. Crawford as a remedy for cancerous and scrophulous affections; and its use was afterwards extended to syphilis. When taken in moderate doses, it appears to increase the secretion by the skin, augments the flow of urine, and improves the tone of the system; but by large doses, violent vomiting, purging, vertigo, and the most dangerous symptoms, are produced. When death is the consequence, it is owing, as Mr. Brodie has ascertained, to the poison acting on the brain and heart. It has undoubtedly been found beneficial in several instances of scrophula, in some cutaneous affections, and in ulcerations connected with elephantiasis; while in syphilis it has the power of suspending some of the symptoms for a short period. But although it be a medicine of some efficacy, yet, to use the words of Mr. Pearson, in whose opinion of its deficient powers as an antisyphilitic we place implicit faith, its "good qualities are uncertain in their operation, and narrowly circumscribed; nor is it a preparation on which great confidence can be placed for the cure of any [3]disease." The dose requires to be carefully apportioned, and very gradually increased, until from ♏ v, which are sufficient at first,

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[1] *Nicholson's Journal,* 4to. iii. 25.

[2] Dissolution de Muriate de Baryte (*F.*) Soluzione di Muriato di Barite (*I.*)

[3] *Observations on Remedies for Lues Venerea,* 92.

♏ xx may be taken twice a day; or more, if nausea be not excited. It is sometimes used externally as an escharotic to fungous ulcers and specks on the cornea.

As antidotes of muriate of barytes, when it has been taken as a poison, M. Orfila has proposed the soluble sulphates, "if administered before a quantity of the salt sufficient to exert its fatal influence on the nervous system be absorbed."[1]

LIQUOR CALCIS. Lond.[2] *Lime-water.*

"Take of lime, *half a pound;* boiling distilled water, *twelve pints.* Pour the water upon the lime, and agitate them together; cover the vessel directly, and set it apart for three hours; then preserve the solution upon the undissolved lime, in well stopped glass bottles, and pour off the clear fluid when it is wanted for use."

SOLUTIO CALCIS, sive AQUA CALCIS. Edin. *Solution of Lime, or Lime Water.*

"Take of lime fresh burnt, *half a pound.* Put it into an earthen vessel, and sprinkle upon it four ounces of water, keeping the vessel covered until the lime becomes hot, and falls into powder; then pour on it twelve pounds of water, and mix the lime with water by agitation. After the lime shall have subsided, repeat the agitation; and let this be done about ten times, the vessel being kept shut that the free access of the air may be prevented. Finally, let the water be strained through paper, interposing between it and the funnel glass rods, that the water may pass through as quickly as possible. It is to be preserved in very well stopt bottles."

Dublin.

"Take of fresh burnt lime, *a pound;* boiling water, *a pint.* Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut until it becomes hot, and falls into powder; then pour upon it *three gallons of water.* The vessel being again shut, let the mixture be frequently shaken for twenty-four hours; and then filter the solution through paper placed in a covered funnel, and preserve it in well stopt bottles."

Of these formulæ, that of the London College is to be preferred; as by keeping the solution upon the lime it is always in a completely saturated state, and the supernatant fluid is generally sufficiently clear to allow it to be decanted off without filtration. It is however adviseable, in making the solution, first to slack the lime with a small portion of water, before the whole quantity be added; as by this it is prevented from running into a paste, which confines the action of the water. Water, when cold, acts more powerfully on lime than hot water, and at 60° retains in solution rather less than 0·002 parts, or one six hundredth part of lime.

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[1] Traité des Poisons, &c. vol. i. p. 182.

[2] Eau de Chaux, (*F.*) Kalkwasser, (*G.*) Aqua di Calce (*I.*)

Qualities. — Lime water is inodorous; has a strong, styptic, acrid taste; is limpid and colourless; and changes to green the vegetable blue and red colours. It unites with oil, forming an imperfect soap. When exposed to the air, it attracts carbonic acid, which, combining with part of the lime held in solution, forms on its surface a pellicle of carbonate of lime, which thickens, cracks, and sinks to the bottom of the vessel, leaving its place to be supplied by another pellicle; and thus, by successive formations, the whole of the lime is abstracted from the water. Hence the necessity of preserving the solution in well closed bottles. It is decomposed by the acids and sulphur, the alkaline carbonates, phosphates, borates, tartrates, and citrates; the infusions of orange-peel, columba, cinchona, rhubarb, and senna, which are consequently incompatible in formulæ with it.

Medical properties and uses. — Lime-water is tonic, antacid, anthelmintic, and externally detergent. It proves very useful in dyspepsia attended with much acidity of the stomach, by neutralizing the acid, and dissolving the sordid mucus with which it is often loaded in this disease; and has also been found efficacious in diarrhœa, diabetes, and leucorrhœa. It destroys intestinal worms, and dissolves the mucus which forms their nidus; and for the same reason proves serviceable in slimy bowels. Its internal use, however, should be occasionally suspended for a few days, as its long continued action on the stomach is apt to prove hurtful. Externally it is applied as a lotion to foul and cancerous ulcers, tinea capitis, and scabies, but with little advantage.

The dose is from f℥ij to Oſs, alone, or diluted with milk.

Officinal preparations. *Oleum Lini cum Calce.* E. D. *Aqua Calcis composita.* D.

LIQUOR ALUMINIS COMPOSITUS. Lond. *Compound Solution of Alum.*

"Take of alum, sulphate of zinc, each *half an ounce*; boiling water, *two pints.* Dissolve the alum and the sulphate of zinc together in the water; then filter the solution."

Medical properties and uses. — This solution is astringent and detergent. It is employed as a lotion for cleansing ulcers, and in some cases of cutaneous eruptions. When properly diluted, it forms a useful collyrium in opthalmia, and an injection in gleet, and in fluor albus when the discharge proceeds only from the vagina.

LIQUOR MURIATIS CALCIS. Lond.[1] *Solution of Muriate of Lime.*

"Take of muriate of lime, *two ounces;* distilled water *three fluid ounces.* Dissolve the muriate of lime in the water, and strain the solution through paper."

SOLUTIO MURIATIS CALCIS. Edin. *Solution of Muriate of Lime.*

"Take of the harder variety of carbonate of lime (namely white marble) broken into small pieces, *nine ounces;* muriatic acid, *sixteen ounces;* water, *eight ounces.* Mix the acid with the water, and gradually add the pieces of carbonate of lime. The effervescence being finished, digest for an hour. Pour off the fluid, and reduce it by evaporation to dryness. Dissolve the residue in its weight and a half of water, and filter the solution."

AQUA MURIATIS CALCIS. Dub. *Water of Muriate of Lime.*

"Take of chalk reduced to a coarse powder, *one ounce;* diluted muriatic acid, *two ounces.* Add gradually the acid to the chalk, and when the effervescence is finished, filter the solution."

In these processes the muriatic acid unites with the lime of the carbonate, and disengages the carbonic acid, which is dissipated in the gaseous form, while the muriate of lime remains dissolved in the water. The evaporation is unnecessary, if an acid of a determinate specific gravity be employed, as ordered by the Dublin College.

Qualities. — This solution is colourless, and has a disagreeable, bitter, acrid taste. It is decomposed by the sulphuric, nitric, phosphoric, fluoric, and boracic acids; the neutral salts into which these enter; and the alkalies and alkaline carbonates, which precipitate the lime. In the solid state, 100 parts of dry muriate of lime, after being exposed to a red heat, consist of 49 of acid, 51 of lime.[2] By mixing four parts of it with an equal quantity of snow, a degree of cold is produced capable of sinking the mercury in the thermometer from 32° to 40° below 0° of Fahrenheit.

Medical properties and uses. — Muriate of lime is deobstruent and tonic. It was introduced into practice by Fourcroy, and has been much recommended as a remedy in scrophulous and glandular diseases. I have given it with evident advantage in bronchocele; and have witnessed more benefit result from its continued use in the varied forms of scrophula, than from any other remedy. Its operation is similar to that of muriate of barytes; but the danger of an over dose is less to be dreaded, and its good effects are more uniform and certain. The dose of the solution is from ♏xx to fʒj, increased gradually to fʒiv, in a sufficient quantity of water or milk, repeated twice or thrice a day.

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[1] Dissolution de Muriate de Chaux (*F.*) Liquore di Muriato di Calce (*I.*)

[2] Marcet.

MAGNESIA. Lond.[1] *Magnesia.*

"Take of (*sub*) carbonate of magnesia, *four ounces.* Burn it in a very strong fire for two hours, or until no effervescence is excited when acetic acid is dropped on it."

Edinburgh.

"Let (*sub*) carbonate of magnesia be exposed in a crucible to a red heat for two hours; after which preserve it in close stopped bottles."

MAGNESIA USTA. Dub. *Calcined Magnesia.*

"Take of magnesia *any quantity.* Let it be put into a crucible, and subjected to a strong heat for two hours; and when it has cooled preserve it in a well closed glass vessel."

The carbonic acid is expelled by the heat, and the pure earth remains in the proportion of five-twelfths of the weight of the subcarbonate employed; or ℥j leaves 200 grs. of magnesia.[2]

Qualities. — It is inodorous and insipid; in the form of a white, very light, soft powder, having a specific gravity of 2·3. It turns to green the more delicate vegetable blues; does not effervesce with acids; is infusible; and requires for its solution 2000 parts of water at 60°. When exposed to the air it attracts slowly carbonic acid. Sir H. Davy has ascertained that, like the other alkaline earths, it is a compound of a peculiar metal, which he has named *magnesium*, and oxygen.

Medical properties and uses. — The same as those of the subcarbonate. It sometimes contains lime, which is discovered by a precipitate falling when oxalate of ammonia is added to its solution in sulphuric acid. Its dose is from grs. x. to ʒſs. taken in water or milk.

MAGNE'SIÆ CARBO'NAS.[3] Lond. *Carbonate of Magnesia.*

"Take of sulphate of magnesia, *a pound*; subcarbonate of potash, *nine ounces*; water *three gallons.* Dissolve separately the subcarbonate of potash in three pints of water, and the sulphate of magnesia in five pints, and filter: then add the rest of the water to the solution of sulphate of magnesia, and boil it, adding to it while it is boiling the solution of the subcarbonate, with constant stirring; and strain through linen. Lastly, wash the powder repeatedly with boiling water, and dry it upon bibulous paper with a heat of 200°."

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[1] Magnesie (*F.*) Gebrannto Magnesia (*G.*) Magnesia (*I.*)

[2] *Black on Magnesia Alba*, 28.

[3] Carbonate de Magnésie (*F.*) Kohlensaure Magnesia (*G.*) Carbonato di Magnesia (*I.*) This preparation should be denominated *Subcarbonas Magnesiæ.* Carbonate of magnesia is obtained by using a larger proportion of the subcarbonate, and allowing the filtered solution to remain at rest for three days. It crystallizes in small transparent hexagonal prisms, terminated by a hexagonal plane. See *Butin sur la Magnésie.*

CARBONAS MAGNESIÆ. Edin. *Carbonate of Magnesia.*

"Take of sulphate of magnesia, *four parts*; subcarbonate of potash *three parts*; boiling water a *sufficient quantity.* Dissolve the salts separately in twice their weight of water, and strain, or otherwise free from impurities; then mix them, and instantly add eight times their weight of boiling water. Boil the liquor for a short time stirring it; then let it remain at rest until the heat be a little diminished, and strain it through linen, upon which the carbonate of magnesia will remain. The carbonate after being well washed with pure water, is to be dried with a gentle heat."

MAGNESIA. Dub. *Magnesia.*

"Take of sulphate of magnesia, subcarbonate of potash, each *two pounds*; boiling water, *twenty pints.* Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix together the defecated liquors; then boil the mixture for a short time, and strain it while it is hot through linen stretched in a proper manner for collecting the magnesia. Wash away the sulphate of kali by repeated affusions of boiling water; and finally, dry the magnesia."

The product of these processes is an insoluble subcarbonate of magnesia. Both the salts are decomposed, and a double exchange takes place; the sulphuric acid separates from the magnesia, and unites with the potash of the subcarbonate, disengaging the carbonic acid, which in its turn combines with the magnesia. The success of the operation depends very much on the degree of attention which is paid to the following circumstances: The water employed in every part of the process must be very soft, either rain water or pure distilled water; the subcarbonate of potash should be previously freed as completely as possible from any admixture of silica, by passing through the alkaline solution a current of carbonic acid, or exposing it to the air for some time before it be used, and the mixing the salts in small portions of water; and after boiling the mixture, throwing it into a large quantity of water. The large proportion of water ordered, and the boiling, are necessary for disssolving the sulphate of potash, and for expelling any redundant carbonic acid which might occasion the magnesia to crystallize, and render it gritty. Mr. Henry recommends to pour off the water by inclination, and to put the precipitate upon chalk-stones for a little time; after which it is to be wrapped up in sheets of white paper, and dried before the fire.[1]

The greater part, however, of the subcarbonate of magnesia found in the shops is prepared, on a great scale, from bittern, the liquor remaining after the crystallization of common salt from sea water. The bittern is heated to 212°, a solution of impure subcarbonate of potash instantly added to it, and the fire withdrawn. The other steps of the process resemble those above detailed.

Qualities. — Subcarbonate of magnesia is inodorous and insipid; perfectly white, very light, smooth to the touch, nearly insoluble in water, and effervesces with acids. Its specific gravity is 0·294.[2] It is decomposed by all the acids, the alkalies, the neutral salts, lime, barytes, alumina, and by a strong heat. According to Dalton, the constituents of 100 parts are 40 of acid, 43 of magnesia, and 17 of water.

Medical properties and uses. — Subcarbonate of magnesia is antacid. It is a useful remedy in acidity of the primæ viæ, particularly of children, in aphthous fever, and that which attends dentition. The compound formed by its union with an acid in the stomach is purgative; but if no acid be present, magnesia does not appear to increase in any degree the peristaltic motion of the bowels. It is preferable to chalk and other absorbents in heartburn, when the bowels are costive; and has been given with advantage in dysentery, combined with ipecacuanha and opium, and the dose followed by a draught of lemonade. In calculus, when the concretions are formed in the kidney, no remedy is so efficacious. The extrication of the carbonic acid in the gaseous state, when the subcarbonate is decomposed by acid in the stomach, sometimes proves inconvenient from the distension it occasions; but more generally it is beneficial. The usual dose is from ʒſs to ʒij, taken in water or milk.

Officinal preparations. *Magnesia.* L. E. D. *Hydrargyrus cum Magnesia.* D.

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[1] *Henry's Experiments on the Preparation, &c. of Magnesia*, 8vo. Lond. 1773.

[2] *Hoffmanni Op.* iv. 473.

TABLE presenting a synoptical view of the Neutral Salts with alkaline and earthy bases, employed as remedies, or for pharmaceutical purposes.[1]

Salts.	Taste.	Figure of Crystals.	Action of Air.	Solubility in 100 parts of Water.		Action of Heat.
				at 60°	at 212°	
Sulphate of barytes	None	Rhomboidal prisms	None	0	0·002	Decrepitates.
——— potash	Bitter	Six-sided prisms	None	6·25	24	Decrepitates.
——— soda	Bitter	Six-sided prisms	Effloresces	35	125	Watery fusion.
——— magnesia	Bitter	Four-sided prisms	None	100	133	Watery fusion.
Alum	Astringent	Octohedrons	Little	20	133	Watery fusion.
Nitrate of potash	Cooling	Six-sided prisms	None	14·3	100	Fuses.
Muriate of barytes	Astringent	Four-sided prisms	None	20	30	Decrepitates.
——— soda	Salt	Cubes	None	35·46	36·16	Decrepitates.
——— lime	Bitter	Six-sided prisms	Deliquesces	400		Watery fusion.
——— ammonia	Acrid	Four-sided pyramids	Subdeliquesces	31	50	Sublimes.
——— magnesia	Bitter	Needles	Deliquesces	151		Watery fusion.
Hyperoxymuriate of potash	Cooling	Rhomboidal plates	None	6	40	Gives out oxygen
Phosphate of lime	None	Six-sided prisms	None	0	0	Fuses
——— soda	Salt	Rhomboidal prisms	Effloresces	25	50	Watery fusion.
Borax	Styptic	Six-sided prisms	Effloresces		16·8	Watery fusion.
Carbonate of barytes	None	Various	None	0·023	0·043	Little.
——— lime	None	Rhomboidal prisms	None	0	0	Decrepitates.
——— potash	Alkaline	Four-sided prisms	None	25	$83\frac{1}{3}$	Watery fusion.
——— soda	Alkaline	Octohedral truncated	Effloresces	50	100+	Watery fusion.
——— magnesia	None	Six-sided prisms	Effloresces	2		Decrepitates.
——— ammonia	Urinous	Irregular	None	50+	100	Evaporates.
Acetate of potash	Hot	Plates	Deliquesces	99		Melts.
——— ammonia	Cool	Slender prisms	Deliquesces	Very soluble.		Melts & sublimes.
Tartar	Acid	Irregular prisms	None	$1\frac{2}{3}$	$3\frac{1}{3}$	Melts.
Tartrate of potash	Bitter	Four-sided prisms	None	25	50	Melts.
Tartrate of potash and soda	Bitter	Eight-sided prisms	Effloresces	20	30	Melts.

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[1] We have formed this Table from the more general table of Dr. Thomson, correcting some of the proportions by experiment. See *System of Chemistry*, 4th ed. iii. 368.

METALLIC PREPARATIONS.

THE pure metals exert no action on the animal system; for, although iron be given in its metallic state, yet it must be changed by acid in the stomach before it can prove active as a remedy. Tin operates only by mechanical attrition; and mercury, which has also been given internally in the metallic form, on mistaken principles, cannot act otherwise than as a mechanical body: but when metals suffer oxidizement, or are changed by acids to the state of salts, they constitute a class of remedies of great activity and importance. The following are

a. employed as remedies in a metallic state,

TIN, MERCURY?

b. variously combined with oxygen, acids, sulphur, &c.

SILVER,
MERCURY,
COPPER,
IRON.
LEAD,
ZINC,
BISMUTH,
ANTIMONY,
ARSENIC.

The union of oxygen with a metallic base is denominated oxidizement, and the resulting compound an *oxide*. This combination, for medicinal purposes is effected in four ways: 1. By the action of atmospheric air, aided by an increased temperature; 2. By deflagration with nitrate of potash; 3. By the action of water; and, 4. By solution in an acid, the acid being afterwards abstracted by an alkali, or some substance for which it has a greater affinity than it has for the oxide of the metal. In whatever manner the oxidizement is effected, metals in changing to oxides lose their lustre, tenacity, inflammability, and other metallic properties; and are gradually converted into earthy-like substances, the weight of which is greater than that of the portion of metal employed. Different metals combine with different quantities of oxygen, which is even the case with the same metal; and as a striking alteration of properties, particularly of colour, marks the maximum and minimum of oxidizement, this is taken advantage of in naming the oxides: thus *black oxide of iron* is iron in its lowest degree of oxidizement; *red oxide of iron*, the metal in its highest degree of oxidizement. There are intermediate degrees, however, which cannot be correctly expressed in language from the colour alone; and consequently the nomenclature of this division of preparations is defective.[1] Some metals are capable of so high a degree of oxidizement as to acquire acid properties, which is so particularly the case with the white oxide of arsenic, that it is regarded as an acid by several chemists. The activity of the oxides of metals on the animal system appears to be regulated, with a few exceptions, by the quantity of oxygen with which they are combined; and therefore, as Dr. Murray has justly observed, "when a process for the preparation of any metallic oxide has once been established, and practitioners have become accustomed to its powers and strength, the process ought not to be varied or changed, from the idea of some trivial improvement; as an alteration of circumstances, apparently of little importance, may give rise to a very important change in the result. And it is nearly demonstrable, that the oxides of a metal formed by different processes, as, for example, by a process conducted in the humid way, or by one with the application of heat, cannot be precisely the same."[2]

Besides the above effects of oxidizement on metals, it renders them capable of uniting with acids, and forming soluble salts. The METALLIC SALTS, therefore, are oxides combined with acids; and this is the case, whether an oxide previously prepared be dissolved in an acid, or whether the salt be the product of the direct solution of a metal in an acid. In the latter case, the metal first gains oxygen either from a part of the acid itself, or from the water, or the air, which it decomposes; and the oxide thus formed is then dissolved by the remainder of the acid. The properties of the metallic salts are much varied by the previous degree of oxidizement of the metals; and this is a point, the fixing of which in pharmaceutical operations is of the first practical importance; for, if in all the indefinite degrees of oxidizement the metallic oxides combine with acids, the resulting salts must vary in as many shades as exist between the maximum and minimum of oxidizement. In the preparation of the metallic salts, therefore, the same strict attention is requisite in following one established and approved process.

No part of chemical and pharmaceutical language is so faulty as the nomenclature of the metallic salts. Thus, although there is no instance of a direct combination of a metal with an acid, yet we have *sulphate of iron*, *nitrate of silver*, *muriate of mercury*, &c.; and to express the combination of the metallic oxides containing a maximum of oxygen, with acids, the syllables *oxy* are prefixed, as *oxysulphate of iron*, *oxynitrate of silver*, *oxymuriate of mercury*, &c. a generic term, which can be properly applied only to denote the compounds of oxymuriatic acid with salifiable bases.

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[1] Dr. Thomson has endeavoured to remedy this defect by introducing the term *protoxide* to signify the lowest degree of oxidizement; *peroxide* the highest; and *deutoxide*, *tritoxide* &c. the intermediate degrees.

[2] *System of Mat. Med.* ii. 253.

The prefixing the terms *sub* and *super* to denote the quantity of acid below or above the point of perfect neutralization in any salt, is not objectionable in a chemical point of view: but for medicinal purposes this mode of distinguishing salts which have the most marked difference in their active properties, by the alteration or the addition of a syllable only, may be productive of the worst consequences: and therefore it is the more remarkable, that the latter terms are employed in all the British pharmacopœias to denote preparations betwixt which there is very little relationship, and which cannot be converted into each other by any subtraction or addition of acid. The illustration of these observations will be found under the individual Preparations.

Many of the metallic salts are altered by exposure to the atmosphere; some effloresce and attract oxygen; some are altered in their properties by moisture; and others are reduced by the action of light: hence, all of them ought to be kept in well stopped glass bottles; and perhaps these always should be either made of green glass, or otherwise rendered opaque. In compositions which require these salts to be dissolved in water, *distilled* or *filtered rain-water* should always be employed, and much attention is requisite to avoid combining them with incompatible substances, which may either chemically decompose them, or alter their medicinal properties.

Sulphur also combines with the metals and their oxides; but its affinity for the former is greater, and hence there are more *metallic sulphurets* than *sulphuretted metallic oxides.* Metallic sulphurets are also formed, when sulphuretted hydrogen gas is thrown into the acid solutions of those metals which have a weak affinity for oxygen: and, as the metallic solutions differ greatly in the degree of facility with which they are thus decomposed, sulphuretted hydrogen gas may be employed, as Proust has shown, for separating different metals held together in the same solutions. The metallic sulphurets are more used for pharmaceutical purposes than as remedies, their dose not being easily appreciated, and their effects uncertain.

PREPARATIONS OF ANTIMONY.

SULPHURETUM ANTIMONII PRÆPARATUM. Edin.[1] *Prepared Sulphuret of Antimony.*

"Put sulphuret of antimony, rubbed to powder in an iron mortar, and levigated with a little water, upon a porphyry stone, into a large vessel; then pour water on it, and, after frequently agitating the vessel, pour it off loaded with the fine powder.

"The coarse powder, which the water cannot suspend, is to be again levigated, and treated in the same manner."

Dublin.

"Let it be reduced to powder, and separate for use the very fine particles, in the manner directed for the preparation of chalk."

This mechanical preparation is intended to fit the sulphuret for internal use.

Qualities.—Prepared sulphuret of antimony is an inodorous, insipid, blackish, or deep leaden gray dull powder, which stains the fingers, and is insoluble in water.

Medical properties and uses.—It is inert, unless it meets with acid in the stomach, in which case it usually operates either as a diaphoretic or mild cathartic, but occasionally produces excessive vomiting and purging; and hence it is proper to evacuate the stomach and bowels previous to its use. It has been found efficacious in scrophula, chronic rheumatism, and herpetic eruptions. The dose is from grs. v to ℈j, mixed with honey or any convenient vehicle.

Officinal preparations. *Oxydum Antimonii.* L. D. *Antimonii Sulphuretum præcipitatum.* L. E. D. *Pulvis antimonialis.* L. E. D.

ANTIMO'NII OX'YDUM. Lond. *Oxide of Antimony.*

"Take of tartarized antimony, *one ounce;* subcarbonate of ammonia, *two drachms;* distilled water, *as much as is requisite.* Dissolve the salts separately in the water, then mix the solutions, and boil the mixture until the oxide of antimony is precipitated. Having poured off the water, wash the precipitate with repeated additions of water, and dry it."

In this process, the ammonia of the subcarbonate decomposes the tartrate of antimony, and forms, with its tartaric acid and the tartrate of potash, a ternary salt, which remains in solution in the water employed, while the oxide of antimony is precipitated. This precipitate is a white protoxide of antimony, the medium oxide of Thenard, containing 0·20 of oxygen in 100 parts.

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[1] Sulphure d'Antimoine (*F.*) Schwazer Schwefelspeiss-glanz (*G.*) Solfuro d'antimonio depurato (*I.*) Kohul (*Arab.*) Surmah (*Hind.*)

Use.—This preparation is violent in its action, and thence should be exhibited with caution: but, as a remedy, it is not ever likely to be much employed; and as it is not essential for the composition of any other preparation, it might be dispensed with.

ANTIMO'NII SULPHURE'TUM PRÆCIPITA'TUM.[1] Lond. *Præcipitated Sulphuret of Antimony.*

"Take of sulphuret of antimony in powder, *two pounds;* solution of potash, *four pints;* distilled water, *three pints.* Mix them, and boil the mixture over a gentle fire for three hours, assiduously stirring it, and occasionally adding distilled water, so that the same measure may be kept up. Strain the solution directly through a doubled linen cloth; and, while it is still hot, drop in gradually as much sulphuric acid as may be necessary for precipitating the powder; then wash away the sulphate of potash with hot water, dry the precipitated sulphuret of antimony, and rub it to a fine powder.

SULPHURETUM ANTIMONII PRÆCIPITATUM. Edin.

"Take of solution of potash, *four parts;* water, *three parts;* prepared sulphuret of antimony, *two parts;* diluted sulphuric acid, *a sufficient quantity.* Mix the sulphuret with the solution of potash and the water, then boil them in a covered iron pot over a gentle fire for three hours, frequently stirring with an iron spatula, and adding water as it may be required. Strain the hot liquor through a doubled linen cloth, and add to it when strained as much diluted sulphuric acid as may be necessary for precipitating the sulphuret, which must be well washed with warm water."

SULPHUR ANTIMONIATUM FUSCUM. Dub. *Brown antimoniated Sulphur.*

"Take of subcarbonate of kali, prepared sulphuret of antimony, each *one ounce.* Having mixed them, melt the mixture in a crucible, and when it is cold, reduce it into powder. Put it into a matrass with four pints of water, and boil for a quarter of an hour; then remove the vessel from the fire, and cover it; let it rest a little; and when the liquor becomes limpid, cautiously decant it from the sediment. The antimoniated sulphur will partly separate as the liquor cools; add as much diluted sulphuric acid as will precipitate the whole of it, which takes place with an excess of acid: then agitate the mixture, in order that the latter precipitate (which is of an orange colour) may be mixed with the rest; and after allowing it to subside, pour off the liquor from the sediment, which is to be washed with cold water as long as litmus indicates the presence of acid in the effused fluid. Finally, dry it upon bibulous paper."

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[1] Formerly, *Sulphur Antimonii præcipitatum, Sulphur auratum Antimonii.* In strict compliance with the principles of the new nomenclature, the present name should be *Hydrosulphuretum Oxidi Antimonii.*—Murray. Soufre doré d'antimoine (*F.*) Gelber Spiessglanzschwefel (*G.*) Zolfo dorato di antimonio (*I.*)

Although the last of these formulæ differs from the two former, their products are the same,—a sulphuretted hydrosulphuret of oxide of antimony. The following is the theory of its formation. During the boiling, the potash combines with the sulphur of the sulphuret of antimony, and forms sulphuret of potash; which decomposing part of the water, and attracting its disengaged hydrogen, is partly converted into a sulphuretted hydrosulphuret of potash, while its oxygen, aided by the sulphuretted hydrogen, oxidizes the antimony, which is dissolved by the sulphuretted hydrosulphuret of potash. The sulphuric acid, which is now added to the strained solution, combines with the potash, disengaging sulphuretted hydrogen gas, and the oxide of antimony is precipitated combined with the disengaged sulphur and the remaining sulphuretted hydrogen. In the Dublin process, the precipitate thrown down whilst the decanted liquor cools is a powder of a brick-red colour, the well-known *kermes mineral*[1], which is the oxide of antimony in union with such portions of sulphur and sulphuretted hydrogen only as it can attract; while the precipitate, afterwards thrown down by the acid, is the old *Sulphur auratum Antimonii*, or a hydrosulphuret of antimony with an excess of sulphur; and hence, by agitating the mixture, a compound, or intermediate product, is obtained, which is the sulphuretted hydrosulphuret of the oxide, as in the former cases. According to Thenard, the oxide in these two powders is in a different state of oxidizement; an opinion, however, which is at least very problematical. The following are the proportions of their constituents given by him: *Kermes mineral* consists of 72·760 parts of brown oxide of antimony, 20·298 of sulphuretted hydrogen, 4·156 of sulphur, and 2·786 of water and loss: *Golden Sulphur of Antimony* contains 68·30 of orange oxide of antimony, 17·877 of sulphuretted hydrogen, 12·00 of sulphur, and 1·823 of water and loss — in 100 parts.[2] But the real difference appears to consist in the larger portion of sulphur thrown down with the *golden sulphur;* the base being the same in both, as stated by Trommsdorff.[1]

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[1] This powder, although now discarded from the pharmacopœias, was long a celebrated remedy. It was discovered by Glauber, and hence named *Panacea Glauberiana*; and the process kept secret until the French Government published it in 1720, having purchased it from one La Legerie, a surgeon, to whom it had been communicated by a pupil of Glauber.

[2] *Annales de Chimie*, xxxii. 268.

Qualities.—The precipitated sulphuret of antimony, as it is called, is an orange-coloured powder, slightly styptic to the taste, inodorous, and insoluble in water. It readily catches fire, and burns with a blue and greenish flame, exhaling the odour of sulphurous acid, and leaving the metal, after the combustion, in the form of a grayish white oxide.

Medical properties and uses. — This preparation of antimony is diaphoretic and expectorant. It was formerly much employed in asthma, and in catarrhal affections; but it is uncertain in its operation, and is not much employed in modern practice; unless when combined with mercurials, when it forms a useful alterative in herpetic and other eruptions. The dose is from gr. j. to grs. iv. in a pill, twice a day.

Officinal preparation. *Pilulæ Hydrargyri submuriatis comp.* L.

ANTIMONIUM TARTARIZATUM. Lond. *Tartarized Antimony.*[2]

"Take of powdered sulphuret of antimony, *two ounces;* nitrate of potash, *one ounce;* supertartrate of potash, *two ounces;* sulphuric acid (by weight), *two ounces;* distilled water, *one pint and a half.* Mix the acid with the water in a glass vessel, and heat the mixture in a sand-bath. When it is moderately warm, add by degrees the sulphur and the nitre previously mixed together, then strain, and boil until all the moisture is consumed. Wash the residue with distilled water, until it remains tasteless, and while it is yet moist mix with it the supertartrate of potash, and throw the whole into a pint of distilled water; finally boil the solution and set it aside to crystallize."

TARTRAS ANTIMONII; olim, TARTARUS EMETICUS. Edin. *Tartrate of Antimony,* formerly *Tartar Emetic.*

"Take of sulphuret of antimony, and nitrate of potash, each, an *equal weight;* supertartrate of potash, a *sufficient quantity.* Triturate separately the sulphuret and the nitre, and having mixed them well together, throw them into a red-hot crucible. When the deflagration is finished, separate the red matter from the white crust, and rub it into a very fine powder, which must be washed with several effusions of warm water; and afterwards dried.

"This powder is now to be rubbed together with an equal weight of supertartrate of potash, and the mixture boiled in a glass vessel, with four times its weight of distilled water for an hour; then strained through paper, and the strained solution set aside to deposit crystals by evaporation."

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[1] *Annales de Chimie,* xxxiv. 132. The quantity of the sulphuretted hydrosulphuret is much increased, by adding to the sulphuret of antimony a small portion of sulphur.

[2] Tartrate de potasse antimonié (*F.*) Spiessglanz-weinstein (*G.*) Tartaro Antimoniato (*I.*)

TARTARUM ANTIMONIATUM, sive EMETICUM. Dub. *Antimoniated* or *Emetic Tartar.*

" Take of nitro-muriatic oxide of antimony, *two ounces*; crystals of tartar, rubbed to a very fine powder, *two ounces and a half*; distilled water, *eighteen fluid ounces*. Boil the water in a glass vessel; then gradually throw into it the oxide and the tartar previously mixed together, and boil the mixture for half an hour; then filter the solution through paper, and allow it to crystallize by slow cooling."

By all these methods a little modified crystallized tartar emetic may be prepared. With regard to the formula of the London College, the instructions for conducting the process are such as are likely to mislead any one not much accustomed to think on chemical phenomena. Thus it is not perfectly apparent whether the fluid which passes the filter, or the residue which remains on it, is to be boiled to dryness. The direction as I have stated in another quarter[1] should be " tum cola, et reliquum super chartam bibulam calore exsicca, &c." After repeated trials we have found the following circumstances necessary to be attended to to insure success. In the first place the sulphuret of antimony must be very finely pulverized in an iron mortar, then well mixed with the nitrate of potash, also reduced to a fine powder, and the mixed powders added by degrees to the mixture of the acid, with the whole of the water heated to 180°, and kept in this temperature for some time after all the powder has been added; the supernatant fluid is then to be decanted off, and the residuum washed with distilled water until the fluid comes off tasteless. We have found no advantage from drying the residuum; but while it is yet moist with the last washing, the supertartrate of potash should be added; and after stirring them well together, the whole thrown into a pint of distilled water. The mixture is then to be boiled for half an hour, filtered whilst it is hot, and the fluid set aside in a flat vessel to crystallize. When the solution has been boiled too long, the crystallization is very irregular.

The following is the probable theory of the changes which take place during the process we have described: — The nitrate of potash is decomposed by the sulphuric acid, as is demonstrated by the extrication of nitrous gas; and part of its oxygen being expended upon the oxide of the sulphuret. This is converted into protoxide of antimony; while, perhaps also at the same time, the sulphur is partly converted into an acid. Sub-sulphate of antimony is then formed by the action of part of the acid on the protoxide, which has a grayish appearance when washed, and is in a state fit to be acted upon by the tartaric acid of the supertartrate of potash, and form the ternary salt.

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[1] *Lond. Med. Repository*, vol. iv. p. 131.

The theory of the other two processes is sufficiently obvious. The superabundant acid of the supertartrate of potash combines with the oxide of antimony, forming a triple salt, or a tartrate of antimony and potash; which, on the principles of the reformed nomenclature, should be the pharmaceutical name of this salt.

It must be regretted that all the Colleges have not concurred in adopting the same preparation of antimony for the formation of this important salt.

Qualities. — Tartrate of antimony and potash is procured in small rectangular trihedral crystals, of a white colour, inodorous, nearly insipid, and efflorescent. It should be bought in crystals; and to ascertain its purity, a few of these should be put into a dilute solution of *ammoniæ sulphuretum*, when their goodness may be judged of by the quantity of orange-coloured precipitate that forms. It is soluble in about 15 parts of water at 60°, and in 2 parts at 212°, forming when the salt is good a perfectly clear transparent solution. It is spontaneously decomposed when kept in aqueous solution; and is also decomposed by heat, the strong acids, the alkalies and alkaline carbonates, the earths, hydrosulphurets, some of the metals, and by the decoctions or infusions of many bitter and astringent vegetables, with which therefore it ought never to be conjoined in extemporaneous prescription. According to the analysis of Thenard[1], its constituents are 35·4 of tartaric acid, 39·6 of oxide, 16·7 of potash, and 8·3 of water; but these proportions must necessarily vary with the different modes of preparation.

Medical properties and uses. — This triple salt is emetic, diaphoretic, expectorant, alterative, and rubefacient; and it operates also sometimes as a cathartic. It is certainly the most important of the antimonial preparations, and when the dose is properly apportioned may supersede the use of all the others. It is given as an emetic in the commencement of fevers, in doses of from one to two grains dissolved in distilled water. To obtain its diaphoretic effect, the dose is from $\frac{1}{16}$th to $\frac{1}{4}$th of a grain; and the same or a smaller dose combined with squill, ammoniacum, and camphor, and repeated every three hours, operates as an expectorant. In very minute doses combined with calomel, it is a powerful alternative in many cutaneous diseases; and when ʒiij of it are triturated with ℥j of lard into an ointment, and applied to the skin, it occasions a local pustular eruption, and hence has proved very serviceable in mania, white swellings, and deep-seated inflammations as a counter irritant.

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[1] *Annales de Chimie*, xxxviii. 39.

When taken in large doses tartar-emetic acts as a corrosive poison, producing violent vomiting, hiccup, a sensation of burning in the stomach, colic, hypercatharsis, syncope, difficult respiration, convulsions, and death. The treatment, when assistance is demanded in time, consists in carrying the poison out of the stomach by bland, oily liquids freely taken; after which decoction of yellow bark should be freely administered, with opium and local bleedings.

Officinal preparations. *Liquor Antimonii tartarizati.* L. *Vinum Tartritis Antimonii.* E.

LI'QUOR ANTIMO'NII TARTARIZA'TI. Lond. *Solution of Tartarized Antimony.*[1]

"Take of tartarized antimony, *a scruple;* boiling distilled water, *four fluid ounces;* wine, *six fluid ounces.* Dissolve the tartarized antimony in the boiling distilled water; then add the wine."

VINUM TARTRATIS ANTIMONII. Edin. *Wine of Tartrate of Antimony.*

"Take of tartrate of antimony, *twenty-four grains;* Spanish white wine, *one pound.* Mix, so that the tartrate of antimony may be dissolved."

These solutions, when newly made are equal in point of strength, f℥j of each containing grs. ij. of tartarized antimony; but the London preparation soon becomes considerably weaker, the large proportion of water employed facilitating the spontaneous decomposition of the salt, which falls to the bottom of the vessel in which the solution is preserved, in the form of a grayish powder. The same circumstance occurs in a smaller degree in the Edinburgh preparation; and therefore the intention of these processes (the obtaining a solution of a determinate strength to afford a ready mode of administering tartarized antimony in very minutely divided doses) is thus in some respects frustrated. The precipitate appears to be an oxide of antimony, with a portion of supertartrate of potash; arising, perhaps from the potash attracting tartaric acid from the wine, and thus breaking the affinity which retains it as a component of the antimonial salt.

Medical properties and uses. — These solutions are diaphoretic or emetic, according to the extent of the dose. In doses of ♏x to f℥j in any proper vehicle, repeated every three or four hours, it usually excites diaphoresis, and is given with this view in the same complaints as the tartarized antimony; but it is principally used as an emetic for infants, a teaspoonful being given every five minutes until vomiting be excited.

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[1] Vinum Antimonii tartarizati. P. L. 1787.

PUL'VIS ANTIMONIA'LIS. Lond. *Antimonial Powder.*

"Take of sulphuret of antimony in powder, *a pound*; hartshorn shavings, *two pounds.* Mix, and throw them into a broad iron pot heated to whiteness, assiduously stirring until the mixture acquire an ash-colour. Take them out, and pulverize them; and then put them into a coated crucible, over which another crucible having a small hole in its bottom is to be inverted and luted. Then place it over the fire, which is to be gradually raised, so that it may continue at a white heat for two hours. Triturate the residue into very fine powder."

OXIDUM ANTIMONII CUM PHOSPHATE CALCIS; olim, PULVIS ANTIMONIALIS. Edin. *Oxide of Antimony with Phosphate of Lime;* formerly *Antimonial Powder.*

"Take of sulphuret of antimony in coarse powder, hartshorn shavings, each *equal parts.* Mix, and throw them into a wide iron pot heated to redness, and stir them assiduously until they are burnt into a matter of a gray colour, which remove from the fire, rub to powder, and put into a coated crucible, over which another crucible having a small hole in its bottom is to be inverted and luted: then apply the fire, which is to be gradually raised to a white heat, and kept at this increased heat for two hours. Finally, reduce the matter when it is cold to a very fine powder."

PULVIS ANTIMONIALIS. Dub. *Antimonial Powder.*

"Take of sulphuret of antimony in coarse powder, hartshorn shavings, each *two pounds.* Boil the hartshorn in a sufficient quantity of water to separate the gluten; then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot heated to redness, assiduously stirring until the sulphurous vapours cease to be extricated, and the matter acquire a gray colour. Rub the mass to powder when it is cold, and put it into a coated crucible; over which invert another crucible having a small hole in its bottom, and lute the two firmly together. Roast the matter with a heat gradually raised to whiteness for the space of two hours; and lastly, when it is cold, grind it to a very fine powder."

In these processes, by the first exposure of the materials to the action of heat, the gelatin and the other principles of the hartshorn, except the phosphate of lime, are decomposed and dissipated; the sulphur of the sulphuret of antimony is at the same time expelled, and the metal is partially oxidized, the oxidizement being favoured by the shape of the vessel and frequent stirring. By the subsequent application of heat, the oxidizement of the metal is rendered more complete, and the oxide is partially vitrified; but whether the phosphate of lime is merely mechanically mixed with the oxide, or the lime yields up part of the phosphoric acid to it, and a ternary compound of phosphate of lime and antimony be thus produced, is uncertain. From the experiments of Chenevix, however, the former supposition seems to be more probable. In the Dublin formula the boiling of the hartshorn shavings ordered is unnecessary, as the heat effectually decomposes the gelatin, which is the only part of them that can be extracted by the boiling. The change in the proportions of the ingredients, and consequently the strength of the preparation, ordered in the present London Pharmacopœia, is to be regretted. Indeed we cannot discover how the change can render the exhibition of it more manageable[1]; and an active preparation, which has long been used, and found to answer the intentions for which it is prescribed, ought not to be hastily altered for any trivial advantage supposed likely to result from the alteration.

From the uncertainty of uniformity in a preparation by the agency of fire, Mr. Chenevix has proposed the substitution of a powder prepared according to the following formula: Let equal parts of white oxide of antimony and of phosphate of lime be dissolved in the smallest possible quantity of muriatic acid, and pour the solution into a sufficient quantity of distilled water containing pure ammonia in solution. A powder precipitates, which is a mechanical mixture of submuriate of antimony and phosphate of lime.[2] The process by heat, however, is still continued in the pharmacopœias, from a desire of imitating, as closely as possible, the celebrated empirical preparation of Dr. James, "James's Powder," as a substitute for which this preparation was first introduced; and which, according to the analysis of Dr. Pearson, consists of 43 parts of phosphate of lime, and 57 of oxide of antimony, in 100 parts.[3]

Qualities.— The antimonial powder of the pharmacopœias is inodorous and insipid, of a dull white colour, insoluble in water, and only partially soluble in acids; in this particular differing from the powder of Chenevix, which is soluble in every acid that can dissolve either of its components.

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[1] *Powel's Translation of the London Pharmacopœia*, 107. [2] *Phil. Mag.* xi. 110.

[3] *Phil. Trans.* lxxxi. 317. Another analysis of this powder has been published lately by M. Pully, an Italian chemist, who gives the following as its constituents: seven parts of protoxide of antimony, four of phosphate of lime, four and a half of sulphate of potash, and three and a half of potash, holding in solution protoxide of antimony. *Annales de Chimie*, lv. 74. *Thomson's Chemistry*, 4th ed. iii. 315.

Medical properties and uses. — The antimonial powder operates as a diaphoretic, alterative, emetic, or purgative, according to the extent of the dose, and the state or habit of the patient to whom it is administered. It is the preparation of antimony most commonly employed in the commencement of fevers, and in inflammatory affections; being generally given with a view to its diaphoretic effect: and when a copious perspiration is early induced, after having previously evacuated the stomach and bowels, fevers of the most threatening aspect are often cut short by it; but when it fails in producing this effect, the protracted use of it may prove hurtful, particularly if the fever assume the typhoid character. The purging, however, which it is apt to induce in typhus, has been, perhaps, too much dreaded; and we have seen good reasons to subscribe to the opinions published by Dr. Hamilton[1], on the use of purgatives in this kind of fever. Those labouring under inflammatory diseases, who can bear considerable discharges by stool, experience the most benefit from the use of the antimonial powder, particularly when venæsection has been previously employed. In acute rheumatism it is advantageously given, combined with camphor, calomel, and opium; and with calomel and guaiacum in several cutaneous affections. As it is insoluble in water, it is given either in the form of a powder, or made up in pills. The dose is from grs. iij. to grs. viij, repeated every fourth hour, diluting freely in the intervals, until its effects are obtained.

PRÆPARATUM EX ARGENTO.

PREPARATION OF SILVER.

ARGENTI NITRAS. Lond.[2] *Nitrate of Silver.*

"Take of silver, *an ounce;* nitric acid, *one fluid ounce;* distilled water, *two fluid ounces.* Mix together the nitric acid and water, and dissolve the silver in the mixture on a sand-bath. Then gradually increase the heat, that the nitrate of silver may be dried. Melt this in a crucible on a gentle fire, until, the water being evaporated, the ebullition cease: then directly pour it into proper moulds."

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[1] *Observations on the Utility of Purgative Medicines,* p. 14. 23.

[2] Argentum nitratum, P. L. 1787. Nitrate d'Argent (*F.*) Salpetersaures Silber (*G.*) Nitrato di argento (*I.*)

NITRAS ARGENTI. Edin. *Nitrate of Silver.*

"Take of pure silver flatted into plates and cut, *one part;* nitric acid diluted, *two parts;* distilled water, *one part.* Dissolve the silver in the acid and water previously mixed together, in a phial with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and place it on the fire, which must be at first gentle, and gradually increased until the mass flows like oil; then pour it into iron pipes previously heated and rubbed with grease. Finally, let the preparation be preserved in a well stopped glass vessel."

Dublin.

"Take of silver flatted into plates and cut; nitrous acid, each *one ounce;* distilled water, *two fluid ounces.* Put the silver in a glass vessel placed in a sand-bath; and pour over it the acid previously diluted. Then dissolve the metal with a gradually raised heat, and evaporate the solution to dryness. Put the mass which remains into a crucible, and dissolve it over a slow fire; finally, let it be poured into proper moulds, and preserve it in a well stopped glass vessel."

In this process the acid is partly decomposed by the silver which is oxidized, and the oxide dissolved as it forms, in the remaining acid. The effervescence is very violent, owing to the extrication of the nitrous gas of the decomposing acid, which flies off in orange-coloured fumes, part of them, however, is retained in the solution, and gives it a blue greenish colour, which goes off as it cools. In this stage of the process, the silver held in solution is in the state of an oxynitrate, which, by due evaporation, may be obtained in brilliant, irregular, thin, six-sided plates, having an intensely bitter taste: and although by the subsequent melting a part of the acid is expelled, yet it is probable that the product is not reduced to the state of a subnitrate.

The difference in the quantity of acid ordered in the different formulæ does not alter the nature of the product; but it is of some consequence, in an œconomical point of view, to know, that even in the Dublin formula, which orders equal parts of silver and acid, the quantity of acid is too great, ten fluid drachms being amply sufficient for the solution of two ounces of silver. Several minute particulars are necessary to be attended to in conducting the process. The silver must be perfectly free from any alloy of copper, which renders the salt always more or less deliquescent. Its presence is indicated when the solution remains of a permanently greenish blue colour: in which case it may be purified by repeated solutions and crystallizations, as long as tabular crystals are produced, the nitrate of copper being left in the mother-water. The acid employed must also be pure; for, if muriatic or sulphuric acids be present, the solution is rendered turbid by the formation of a precipitate of sulphate and muriate of silver; which however, when only in small quantity, does not impede the process, and is easily separated by simple subsidence, after the nitric acid is fully saturated. For the same reasons the water must be pure; and therefore distilled water, or filtered rain water, should be employed. The granular form of the silver is preferable to the laminated form ordered by the Colleges. For the subsequent evaporation and melting, a porcelain crucible should be used, as the fused silver is apt to sink into the substance of the common crucibles: and it should be of ample size to allow of the swelling and ebullition. The heat must not be continued after the fusion is complete; for by continuing the application of heat, the nitric acid is expelled, and the silver partially reduced; but it should be directly run into the moulds, which may be made of iron; or, in a mass of well-tempered pipe-clay, holes of the size required may be perforated by means of a greased quill, and the fused nitrate run into them. When cold, each piece must be cleaned from the grease, and separately rolled up in clean white paper.

Qualities.—Fused nitrate of silver is in small solid cylinders of a dark gray colour, and presenting, when broken across, a crystallized structure. It is inodorous, has an intensely bitter, metallic, caustic taste, and tinges the skin and hair black wherever it touches, owing to the reduction of the nitrate by the extension of it on the cuticle. It is not deliquescent. It is soluble in an equal weight of water at 60°, and is also soluble in alcohol. It is blackened and reduced by exposure to light or a strong heat, by phosphorus, hydrogen gas, and the hydrosulphurets; is precipitated from its aqueous solution by mercury, copper, and some other metals; and is decomposed by the alkalies, with the exception of ammonia, the alkaline earths, sulphuretted hydrogen, the hydro-sulphurets, the sulphuric, muriatic, and arsenious acids, the majority of the neutral salts, and by astringent vegetable solutions. The constituents of 100 parts are, 64 of silver, 6 of oxygen, and 30 of nitric acid.

Medical properties and uses. — Nitrate of silver is tonic, antispasmodic, and escharotic. It was introduced as an internal remedy by Angelus Sala, in the commencement of the 17th century. It is said to prove efficacious in epilepsy, and its utility in angina pectoris, and chorea, is well known. In these cases it is given in doses of $\frac{1}{8}$th of a grain, gradually increased to grs. iv.

or more, three times a day; but little advantage is gained, unless its use be preceded, by a course of purgatives. The best form of administering it is that of pill made with crumb of bread. But the chief use of nitrate of silver is as an external application to destroy strictures of the urethra, warts, fungous excrescencies, and incipient chancres. In solution, in the proportion of gr. ij to f℥j of distilled water, it forms a good injection in fistulous sores; and a lotion in that disease of the gums generally denominated scurvy, in which the gum becomes spongy, and its edges hang loosely about the necks of the teeth. When this latter disease, however, rises to a great height, the sore edges of the gum should be touched with a hair pencil dipped in a much stronger solution, in the proportion of ʒj of the nitrate of silver to f℥j of distilled water.[1] A solution of one part of the nitrate in 1000 parts of water is recommended by Hahnemann[2] as an application to old sores, and for healing the ulcers of the mouth produced by the use of mercurials.

When given in too large doses, it acts as a poison on the system, producing symptoms resembling those induced by the other corrosive poisons. M. Orfila regards common salt as the antidote of this poison, when given sufficiently early to prevent the specific action of the nitrate on the coats of the stomach[3]: but at the same time, local and general bleeding, tepid baths, and emollient fomentations and glysters must be employed, if any symptom of abdominal inflammation be perceived.

PRÆPARATA EX ARSENICO.

PREPARATIONS OF ARSENIC.

ARSENICI OXYDUM SUBLIMATUM. Lond.[4] *Prepared Oxide of Arsenic.*

"Reduce oxide of arsenic to powder; then put it into a crucible, and, applying heat, sublime it into another crucible inverted over the first."

The greater part of the oxide of arsenic found in the shops, is in the form of semivitreous cakes, which are the product of a second sublimation of the oxide, after it is obtained from roasting ores of cobalt. Although prepared on a great scale, yet it is as pure as sublimation can make it, and therefore this process is superfluous; and as it is also not devoid of risk to the operator, it should be altogether rejected.

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[1] *Fox on the Natural History and Treatment of Diseases of the Teeth.*

[2] *Annales de Chimie*, iii. 308.

[3] *Traité des Poisons, &c.* tom. i. p. 49.

[4] Oxide d'arsenique pure (*F.*) Weisses Arsenick (*G.*) Arsenico blanco (*I.*)

LIQUOR ARSENICALIS.[1] Lond. *Arsenical Solution.*

"Take of prepared oxide of arsenic rubbed to a very fine powder, subcarbonate of potash from tartar, each *sixty-four grains*; distilled water, *a pint*. Boil them together in a glass vessel until the arsenic be entirely dissolved. Add to the solution when it is cold compound spirit of lavender, *four fluid drachms*; and then as much distilled water as will make the whole up to a pint."

SOLUTIO ARSENICALIS. Edin. *Solution of Arsenic.*

"Take of oxide of arsenic rubbed to very fine powder, very pure subcarbonate of potash, of each *sixty-four grains*; distilled water *fourteen ounces*. Boil them together in a glass vessel until all the oxide be dissolved. Add to the solution, when it is cold, *half an ounce* of compound spirit of lavender, and as much distilled water as will make the whole up to sixteen ounces."

The white oxide of arsenic possesses properties in some respect similar to those of an acid. It combines with alkalies, is soluble in water, and the solution reddens tincture of litmus: but it also combines with and neutralizes the acids; so that, while some[2] regard it as an acid, others[3] consider it only as a highly oxidized oxide. In the above process, by combination with the potash, its solubility is much increased, and a solution obtained of an uniform strength, by which very minute doses can be correctly and easily apportioned. It was introduced by Dr. Fowler of Stafford, whose formula the London College has adopted, altering only the proportions of the water and the spirit of lavender, to make up the pint of the solution.

Qualities.—This solution, one fluid drachm of which contains half a grain of oxide of arsenic, has the odour, taste, and colour of the compound spirit of lavender. It is decomposed by lime-water and hydrosulphuret of potash, and instantly forms a copious precipitate when dropped into infusion or decoction of cinchona bark; with which, therefore, it ought not to be conjoined in extemporaneous prescriptions.

Medical properties and uses.—The arsenical solution, as it is termed, is a powerful tonic, useful in all the cases in which the white oxide can be employed. (See *Arsenici Oxydum*, Part ii.) It was introduced by Dr. Fowler as a substitute for the celebrated empirical remedy known under the name of "the ague drop," which owes its efficacy to the oxide of arsenic. In addition to the account we have already given of the medicinal use of the oxide, we have to add that we have given this solution with decided advantage after cupping and purging, in threatened apoplexy when the strength was little and the complexion pale. The dose is ♏ iv gradually increased to ♏ xx, given twice a day.

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[1] This appellation is certainly very objectionable, as it conveys an erroneous idea of the preparation, even admitting that the term *arsenic* may be used to designate the *white oxide*: it should have been *Liquor Arsenialis Potassæ*, or perhaps more properly, *Liquor alcalinus Oxidi Arsenici.*

[2] Fourcroy.

[3] Berthollet.

ARSENIAS KALI. Dub. *Arseniate of Kali.*

"Take of white oxide of arsenic, nitrate of kali, each *an ounce*. Reduce them separately to powder; then having mixed them, put them into a glass retort, and place it in a sand-bath exposed to a gradually raised heat, until the bottom of the retort becomes obscurely red. The vapours arising from the retort should be transmitted through distilled water, by means of a proper apparatus, in order that the nitrous acid extricated by the heat may be disengaged. Dissolve the residue in four pounds of boiling distilled water, and after due evaporation set it apart, that crystals may form."

In this process the nitrate of potash is decomposed by the heat; part of the oxygen of the nitric acid with the whole of its nitrogen escape in the form of nitrous gas, while the remainder of the oxygen is attracted by the oxide of arsenic, which is thus converted into arsenic acid, and combines with the disengaged potash of the nitrate, forming a superarseniate of potash: this remains in the retort in the form of a white saline mass, and is afterwards dissolved and crystallized. The nitrous acid is not worth condensing, as the process is not likely to be performed on a great scale.

Qualities.— Arseniate, or rather superarseniate[1], of potash crystallizes in beautiful, transparent, tetraëdral prisms, having an excess of acid. They are soluble in water; and the solution reddens the vegetable blues.

Medical properties and uses.—This salt may be used exactly in the same manner, and in the same cases as the white oxide. It was discovered by Macquer, and long known under the name of "the arsenical neutral salt of Macquer." The dose is from one-sixteenth to one-eighth of a grain, formed into a pill with crumb of bread.

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[1] The arseniate is uncrystallizable and deliquescent, and altogether a different salt; the Dublin College therefore has improperly named it *Arsenias Kali.*

PREPARATA E CUPRO.

PREPARATIONS OF COPPER.

ÆRUGO PRÆPARATA. Dub.[1] *Prepared Verdegris.*

"Let the verdegris be reduced to powder, and the more subtile parts be separated in the manner directed for the preparation of chalk."

By this process the subacetate of copper is obtained in a state of very minute mechanical division, better fitted for internal use, in the cases for which it is sometimes prescribed. (See *Ærugo*, Part ii.)

CUPRUM AMMONIATUM. Lond. *Ammoniated Copper.*[2]

"Take of sulphate of copper, *half an ounce;* subcarbonate of ammonia, *six drachms.* Rub them together in a glass mortar until the effervescence cease; then wrap up the ammoniated copper in bibulous paper, and dry it with a gentle heat."

AMMONIARETUM CUPRI. Edin. *Ammoniuret of Copper.*

"Take of pure sulphate of copper, *two parts;* subcarbonate of ammonia, *three parts.* Rub them thoroughly together in a glass mortar, until all effervescence is finished, and they unite in a violet-coloured mass, which wrap up in bibulous paper, and dry, first on a chalk stone, and afterwards with a gentle heat. Let it be preserved in a well stopped glass phial."

CUPRUM AMMONIATUM. Dub. *Ammoniated Copper.*

"Take of sulphate of copper, *an ounce;* carbonate of ammonia, *an ounce and a half.* Rub them in an earthenware mortar, until all effervescence having ceased, they unite into a mass, which is to be dried, wrapped up in bibulous paper, and preserved in a phial closed with a glass stopper."

The product of these processes is either a triple salt, a subsulphate of oxide of copper and ammonia, or a mixture only of subsulphate of copper, and subsulphate of ammonia[3]; but the former is the more probable state of the compound, from the difference of capacity which it has for water being so great as to render the resulting mass extremely moist. During the trituration, the sulphate of copper is partially decomposed, and part of its acid yielded up to the ammonia, which is consequently freed from the carbonic acid, the effervescence being the effect of the dissipation of this disengaged acid in the gaseous form. The action of the affinities, which produce these changes, is perhaps aided by the water of crystallization of the ingredients becoming fluid. In drying the product it must be very carefully excluded from the air.

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[1] Vert-de-gris (*F.*) Grünspan (*G.*) Acetato di Rame (*I.*) Cardenillo (*S.*)

[2] Schwefelsaures Kupfer mit Ammonium (*G.*) Ammoniuro di Rame (*I.*)

[3] It is certainly not an ammoniuret, although so designated in the Edinburgh Pharmacopœia.

Qualities. — This preparation has the odour of ammonia, a hot, styptic, metalline taste, and a rich blue colour. By exposure to the air the blue colour is lost, and the salt acquires a greenish hue.

Medical properties and uses. — Ammoniated copper is tonic and antispasmodic. It has been principally employed in epilepsy, as a remedy for which it was first proposed by Dr. Cullen; and has since his time been frequently employed with evident advantage — although we must confess, that in our trials of it the event has not been such as to encourage us to place much dependence on its powers for relieving this severe disease. It is less apt to excite nausea than the other preparations of copper. Cullen, however, recommends its use not to be continued for more than a month at a time; and adds, that after the first interval, if the disease continues, the most benefit will be derived from giving the medicine "only for some days before an expected accession."[1] It has been given with advantage in chorea, after a course of purgatives, combined with digitalis and myrrh.

The dose is gr. ¼th gradually increased to grs. v. given twice a day, either simply made into pills with crumb of bread, or combined with valerian.

LIQUOR CUPRI AMMONIATI. Lond. *Solution of Ammoniated Copper.*

"Take of ammoniated copper, *a drachm*; distilled water, *a pint*. Dissolve the ammoniated copper in the water, and filter the solution through paper."

AQUA CUPRI AMMONIATI. Dub. *Water of ammoniated Copper.*

"Take of lime-water, *eight fluid ounces*; muriate of ammonia, *two scruples*; prepared verdegris, *four grains*. Let them be mixed together, and digested for twenty-four hours; then pour off the clear liquor."

As nearly the same result follows whichever of these processes is adopted; that of the London pharmacopœia, from its simplicity, is undoubtedly to be preferred, although too much water is ordered. In the Dublin process, the lime decomposes the muriate of ammonia, and combines with its muriatic acid, forming a muriate of lime, while the disengaged ammonia unites with the oxide of copper of the verdegris, and forms a soluble compound. It differs from the simple solution of ammoniated copper, in holding also the muriate of lime in solution; and is a stronger preparation, for nearly one-half of the oxide of the ammoniated copper is precipitated by the excess of water.

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[1] *Mat. Med.* ii. 25.

Medical properties and uses.—This solution is detergent, and mildly escharotic. It forms an useful local stimulant for cleaning foul indolent ulcers, and disposing them to heal; and is also employed, still more largely diluted, for removing specks from the cornea.

SOLUTIO SULPHATIS CUPRI COMPOSITA. Edin. *Compound Solution of Sulphate of Copper.*

"Take of sulphate of copper, sulphate of alumina, each *three ounces;* water, *two pounds;* sulphuric acid, *one ounce and a half.* Boil the sulphates in the water, to dissolve them; and then to the liquor filtered through paper add the acid."

This preparation is a simple solution of the sulphates. It is sometimes used as a styptic for stopping hæmorrhages; and largely diluted as a lotion in ophthalmia tarsi, and the purulent ophthalmia of infants.

As has been already noticed (Part ii.) the best antidote for the salts of copper, when taken as poisons, is sugar.

PRÆPARATA E FERRO.

PREPARATIONS OF IRON.

LIMATURA FERRI PURIFICATA. Edin.[1] *Purified Filings of Iron.*

"Having placed a sieve over the filings, apply a magnet, so that it may draw the filings upwards through the sieve."

The iron filings obtained from the workshops are always mixed with many impurities, and often with filings of copper and other metals. It requires some address to purify them by this process; at least the sieve must not be placed too close upon the filings, but as distant as the sphere of attraction of the magnet will admit of, so that the iron only may be raised.

OXIDUM FERRI NIGRUM PURIFICATUM.[2] Edin. *Purified Black Oxide of Iron.*

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[1] Limaille de Mars (*F.*) Gepülvertes Eisen (*G.*) Limatura di Ferro (*I.*) Eerumboo Podia (*Tam.*)

[2] L'oxide noir de Fer (*F.*) Schwarzes gesäuertes Eisin (*G.*) Ossido nero di Ferro (*I.*)

"Let the scales of the black oxide of iron, found at the anvil of the blacksmith, be purified by the application of the magnet; for the magnet attracts the thinner and purer scales only, leaving the larger and less pure."

OXYDUM FERRI NIGRUM. Dub. *Black Oxide of Iron.*

"Let the scales of iron, found at the blacksmith's anvil, be purified by the application of the magnet. Then reduce them to a powder, the finest parts of which are to be separated in the manner ordered for the preparation of chalk."

The scales struck off from red-hot iron by the hammer of the blacksmith are imperfectly oxidized, but still retain their magnetic quality in a sufficient degree to admit of being purified in the above manner.

Medical properties and uses.—This imperfect oxide is tonic, deobstruent, and anthelmintic. It is efficaciously administered in general debility, dyspepsia, chlorosis, and worm cases. Its utility is determined by its meeting with acid in the stomach, which is known to be the case by the disagreeable eructations it produces, and the black colour of the alvine evacuations. The dose is from grs. v to ℈j, combined with any aromatic powder, or formed into an electuary with honey, and taken twice a day.

FERRUM AMMONIATUM. Lond. *Ammoniated Iron.*[1]

"Take of subcarbonate of iron, muriate of ammonia, each *a pound.* Mix them accurately together, and instantly sublime, by the application of a strong heat; finally, reduce them to powder."

MURIAS AMMONIÆ ET FERRI. Edin. *Muriate of Ammonia and Iron.*

"Take of the red oxide of iron washed and again dried, muriate of ammonia, each *equal parts by weight.* Mix them well together, and sublime by a quick fire. Reduce the sublimation to powder and preserve it in a well stopped phial."

MURIAS AMMONIÆ ET FERRI. Dub. *Muriate of Ammonia and Iron.*

"Take of red oxide of iron, muriate of ammonia, each *equal parts by weight.* Having mixed them well together, sublime them with a sudden and sufficiently strong heat."

Of these processes, those of the Edinburgh and Dublin Colleges are to be preferred, for the reasons below stated. The theory of the operation is obvious: the sudden application of an intense heat enables the oxide of iron to decompose the muriate of ammonia, and to unite with part of its muriatic acid, and at the same time it probably enters into that degree of combination with the ammonia, which exists in triple salts, the product being either a muriate of iron and ammonia, or a mixed mass of submuriate of ammonia, and submuriate of iron: some difference, however, takes place when the carbonate of iron, ordered by the London College, is employed; for, a portion of subcarbonate of ammonia being formed, which does not combine with the iron, the formation of *ferrum ammoniatum* is limited: and the sublimed product, instead of being wholly composed of this salt, is only a mixture of it with subcarbonate of ammonia. The strength of the preparation depends very much on the degree of heat employed, and the quickness of the sublimation.

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[1] Ferrum ammoniacale, P. L. 1787. Fleurs de Mars ammoniacales (*F.*) Eisenhaliges Salzsaures Ammonium (*G.*)

Qualities. — Muriate of ammonia and iron has an odour, resembling, in some degree, that of saffron, and a styptic taste. It is in crystalline grains of an orange colour; soluble in alcohol, and deliquescent; on which account this salt requires to be preserved in very well stopped phials."

Medical properties and uses. — This preparation of iron is tonic, emmenagogue, and aperient. It was formerly much used in epilepsy, hysteria, chlorosis, scrophula, and rickets; but on account of the uncertainty of the preparation it is now seldom prescribed. The dose is from grs. iij. to grs. xv. given twice or thrice a day.

Officinal preparation. *Tinctura Ferri ammoniati.* L.

SUBCARBONAS FERRI PRÆPARATUS. Edin.

Prepared Carbonate of Iron.[1]

"Let purified filings of iron be frequently moistened with water, till they fall into rust, which is to be rubbed to powder."

FERRI RUBIGO. Dub. *Rust of iron.*

"Take of iron wire, *any quantity*. Cut it into small pieces, which are to be exposed to the air, and frequently moistened with water, until they be converted into rust; let this be rubbed in an iron mortar, and by pouring water on it, wash over the finest part of the powder, which is to be dried."

In these processes the iron is oxidized at the expense of the water which is decomposed, while at the same time carbonic acid is attracted from the atmosphere, and combined with the oxide. The product is a subcarbonate of oxide of iron, for the quantity of acid is not equivalent to the neutralization of the oxide.

According to my experiments, it consists of 85 parts of oxide of iron, and 15 of carbonic acid; but these proportions must necessarily vary from variations in the conduct of the process.

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[1] Carbure de Fer (*F.*) Rost (*G.*) Ossido carbonato di Ferro (*I.*) Sudud ul hidud (*Arab.*) Eerumbo tuppoo (*Tam.*)

Qualities.—It is inodorous, has a styptic taste, and a reddish-brown colour; dissolves in acids with effervescence; and is decomposed by heat.

Medical properties and uses.—The rust of iron is tonic and emmenagogue. Next to the black oxide it is the least active of the preparations of this metal. It has lately been recommended with much confidence, both as an internal remedy, and an external application in cancer.[1] In large doses it often occasions uneasiness at the stomach; yet Cullen says, "We have always found the simple rust as effectual as any other preparation; and the stomach bears it better than any [2]other." It is given in the form of pills, combined with aromatics and bitter extracts. The dose is from grs. iv. to ℈j. given twice a day.

Officinal preparation. *Tinctura Muriatis Ferri.* D.

FERRI SUBCARBONAS. Lond. *Subcarbonate of* [3]*Iron.*

"Take of sulphate of iron, *eight ounces;* subcarbonate of soda, *six ounces;* boiling water, *a gallon.* Dissolve separately the sulphate of iron and the subcarbonate of soda in eight pints of water; then mix together the solutions, and set the mixture aside, that the powder may subside; then pour off the supernatant fluid, wash the sub-carbonate of iron in hot water, and dry it, wrapped up in bibulous paper, with a gentle heat."

CARBONAS FERRI PRÆCIPITATUS. Edin. *Precipitated Carbonate of Iron.* CARBONAS FERRI. Dub. *Carbonate of Iron.*

"Take of sulphate of iron, *four ounces;* subcarbonate of soda, *five ounces;* water, *ten pounds.* Dissolve the sulphate in the water: then add the subcarbonate previously dissolved in the water, and mix them together. Let the carbonate of iron, which is precipitated, be washed with tepid water, and afterwards dried."

This preparation is also a subcarbonate of iron. By mixing the solutions together, a double decomposition is effected; the sulphuric acid of the sulphate of iron combines with the soda, while the iron attracts the disengaged carbonic acid of the subcarbonate of soda; and hence the products are an insoluble subcarbonate of iron, and a soluble sulphate of soda, which are easily separated by washing and filtration. When first precipitated, the subcarbonate of iron has a deep green colour, and is at a minimum of oxidizement; but while drying, it attracts oxygen rapidly from the atmosphere, and is converted into the red oxide, or a peroxide, containing, according to Proust, 48 per cent. of oxygen. I have found that the precipitate combines with the largest proportion of carbonic acid, when the solutions are mixed at a temperature of 150° of Fahrenheit; and filtration is necessary for separating it, the decantation of the clear fluid being very difficult, owing to the lightness of the precipitate. The great solubility of the sulphate of soda renders much subsequent washing unnecessary; and the precipitate, after being washed, should be dried in the paper on which it is filtered, by a heat not exceeding 200°.

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[1] *Carmichael on the Use of Carbonate of Iron in Cancer.*

[2] It is the carbonate of iron which is contained in chalybeate waters, held in solution by the excess of carbonic acid. By exposing these waters to the air, the carbonic acid flies off, oxygen is attracted, and the carbonate falls down in the form of a yellowish sediment.

[3] Chalybs præparatus è aceto, et sine aceto, P. L. 1720. Chalybis rubigo præparata, P. L. 1745. Ferri rubigo, P. L. 1787.

Qualities.—Precipitated subcarbonate of iron is inodorous, has a slightly styptic taste; and when properly prepared is of a chocolate-brown colour. It is insoluble in water, but acids dissolve it with effervescence, disengaging the carbonic acid in the gaseous form. It is decomposed by heat, and converted into the black oxide of the metal. In my experiments, ten grains of the dried subcarbonate, prepared with effloresced subcarbonate of soda, lost 2·3 grains, when dissolved in muriatic acid; and the same quantity, prepared with the crystallized alkali, and dried with great care, lost 1·4; so that prepared in the former method, it contained 23 per cent. of carbonic acid, and in the latter 14 per cent.

Medical properties and uses.—This preparation differs little from the former preparation in its effects, except that it sits easier on the stomach. The dose is from grs. iv. to grs. xxx.; given three times a day, combined with myrrh, or aromatics.

Officinal preparations. *Ferrum ammoniatum.* L. *Tartarum Ferri.* D. *Tinctura Ferri Muriatis.* L.

FERRI SULPHAS. Lond. *Sulphate of Iron.*[1]

"Take of iron, sulphuric acid, each *eight ounces;* water, *four pints.* Mix the sulphuric acid with the water in a glass vessel, and to these add the iron; then, when the effervescence is over, filter the solution through paper, and evaporate it over the fire, so that crystals may form as it cools. Pour off the water, and dry the crystals upon bibulous paper."

SULPHAS FERRI. Edin. *Sulphate of Iron.*

"Take of purified filings of iron, *six ounces;* sulphuric acid, *eight ounces;* water, *two pounds and a half.* Mix, and when the effervescence is over, digest the mixture for some time upon hot sand; then filter the solution through paper, and after due evaporation set it apart, that crystals may form."

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[1] Old names of this salt:—*misy, sory, calchantum;* (Pliny) *sal martis, sal chalybis vitriolum ferri, vitriolum martis.* *Syn.* Sulfate de Fer (*F.*) Schwefelsäures Eisen (*G.*) Solfato di Ferro (*I.*) Una Baydie (*Tam.*) Casis (*Hind.*)

SULPHAS FERRI. Dub. *Sulphate of Iron.*

"Take of iron wire, *two ounces;* sulphuric acid, *three ounces and a half;* water, *one pint.* Mix gradually the acid with the water; then add the wire cut into pieces, and digest the mixture that the metal be dissolved, after which filter the solution through paper; finally, after due evaporation, set it apart, that crystals may form by slow cooling."

In these processes part of the water is decomposed, the iron is oxidized by combining with its oxygen, while its hydrogen is dissipated in the gaseous form; and the oxide thus produced unites with the acid and forms sulphate of iron, or rather sulphate of oxide of iron; which is dissolved in the undecomposed portion of the water. Concentrated sulphuric acid, nevertheless, scarcely exerts any action on iron at a low temperature, and water alone is very slowly decomposed by it, so that the rapid decomposition of the diluted acid by the iron must be ascribed to the sum of the affinities of the base of the acid for oxygen, and of the iron for oxygen being superior to that of the oxygen to the hydrogen of the water, which is therefore decomposed. The solution is of a pale green colour, and when evaporated directly, yields crystals of sulphate of iron[1]; but if it be exposed for some time to the atmosphere it attracts oxygen, becomes turbid, a subsulphate is precipitated, and the salt obtained is an oxysulphate.

Qualities. — Sulphate of iron has a strong styptic taste: it crystallizes in transparent rhomboidal prisms, of a fine green colour, which redden the vegetable blues; are soluble in two parts of water at 60° and ¾ths of their weight of boiling water, and are insoluble in alcohol. When exposed to the air, the crystals become opaque, and are covered with a yellow powder, owing to the attraction of the oxygen of the atmosphere by the salt, during its efflorescence. Exposed to heat sulphate of iron undergoes the watery fusion; and in an increased heat the acid is driven off, and the base remains in the state of a red oxide, the colcothar of vitriol of commerce. According to Dr. Thomson[2], 100 parts of the green sulphate consist of 26.7 of sulphuric acid, 28·3 oxide of iron, and 45·0 of water.[3] The following substances decompose sulphate of iron: the earths, the alkalies and their carbonates; borate of soda, phosphate of soda, muriate of barytes, nitrate of silver, acetate and superacetate of lead, and almost every salt, the base of which forms an insoluble compound with sulphuric acid: hence these are incompatible in formulæ with this salt.

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[1] This salt, which is known in commerce by the name of *green vitriol*, is prepared on the great scale from native sulphurets of iron, by exposing them to the air and moistening them, till a crust of sulphate of iron is formed on their surface, which is afterwards obtained in crystals by solution and evaporation.

[2] *System of Chemistry*, 4th ed. iii. 225.

[3] Of this quantity of water, 8 parts are water of composition, the oxide being in the state of a *hydrate.*

Medical properties and uses.—Sulphate of iron is tonic, emmenagogue, and anthelmintic.[1] It is a useful remedy when exhibited with due caution, in all cases in which preparations of iron are indicated; but in improper doses it occasions pain of the bowels, nausea, and vomiting, and often proves hurtful by being too long continued. It has been given with advantage in diabetes, in the latter stage of phthisis, and in amenorrhœa, depending on a weakened action of the blood-vessels. The dose is from gr. j. to v. combined with ammoniacum, rhubarb, myrrh, or bitter extracts. It has lately been used dissolved in water as a lotion to cancerous and phagedenic ulcers.[2]

Officinal preparation. *Tinctura Ferri Muriatis.* D.

SULPHAS FERRI EXSICCATUS. Edin. *Dried Sulphate of Iron.*

"Take of sulphate of iron, *any quantity.* Let it be heated in an unglazed earthen vessel, on a moderate fire, until it become white, and perfectly dry."

SULPHAS FERRI EXSICCATUM. Dub. *Dried Sulphate of Iron.*

"Take of sulphate of iron *any quantity.* Let it whiten by exposing it in an unglazed earthen vessel, to a high temperature."

In these processes the degree of heat should not exceed 212° of Fahrenheit. The salt is merely deprived of its water of crystallization, without undergoing any chemical change.

Officinal preparation. *Oxydum Ferri rubrum.* E. D.

OXIDUM FERRI RUBRUM. Edin.[3] *Red Oxide of Iron.*

"Let dried sulphate of iron be exposed to a violent heat, until it is converted into a red-coloured substance."

OXYDUM FERRI RUBRUM. Dub. *Red Oxide of Iron.*

"Let dried sulphate of iron be roasted in a strong fire until it is converted into a red substance; then let this be washed till the water poured from it does not indicate, by the test of litmus, the presence of any acid; and lastly, dry it upon bibulous paper."

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[1] It was used as an anthelmintic in the time of Pliny, who says, "Sumitur ad depellenda ventris animalia drachmæ pondere cum melle." *Nat. Hist.* lib. xxxiv. cap. 12.

[2] *Edinburgh Med. and Surg. Journal,* ii. 373.

[3] Oxide de fer rouge (*F.*) Eissenoxyd (*G.*) Perossido rosso di Ferro (*I.*)

By the degree of heat employed, the sulphuric acid of the sulphate is partly driven off in a highly concentrated state, and partly decomposed, sulphurous acid being disengaged, and the oxide, which is the base of the sulphate, becomes more highly oxidized.

The residue is the red oxide of iron, combined with a portion of the red sulphate, which renders it deliquescent; and which should therefore be separated by washing, as directed by the Dublin College.

According to Proust, the red oxide at the highest degree of oxidizement consists of 48 parts of oxygen and 52 of iron.

Medical properties and uses.—This preparation is possessed of the same medicinal properties as the other preparations: but it is very rarely used, except as a pharmaceutical agent.

Officinal preparation. *Murias Ammoniæ et Ferri.* E. D.

FERRUM TARTARIZATUM. Lond. *Tartarized Iron.*

"Take of iron, *a pound;* supertartrate of potash, in powder, *two pounds;* water, *a pint.* Rub them together, and expose the mixture in an open glass vessel to the action of the air for eight days; then dry it in a sand-bath, and reduce it to a very fine powder. To this powder add a pint of water, and put it aside for eight days; then dry it, and reduce it to powder."

TARTRAS POTASSÆ ET FERRI. Edin.[1] *Tartrate of Potash and Iron.*

"Take of purified filings of iron, *one part;* supertartrate of potash powdered, *two parts;* water, *one part.* Rub them together and expose them to the air in a shallow earthen vessel for fifteen days, stirring the mass daily with a spatula, and keeping it moist by frequent additions of water. Then boil the whole for a short time in four times its weight of water, and pour off the solution from the other fæces. Evaporate the solution to dryness in a water bath, and having rubbed the mass into powder, preserve it in a well-stopped bottle."

TARTARUM FERRI.[2] Dub. *Tartar of Iron.*

"Take of carbonate of iron, *half an ounce;* crystals of tartar in very fine powder, *an ounce;* distilled water, *a pint.* Let them be put into a glass vessel, then boiled for an hoúr over a slow fire, and the liquor filtered through paper; when this is cold, filter it again, and evaporate it until a pellicle appears on the surface: the liquor, as it cools, will concrete into a saline mass, which is to be reduced to powder, and preserved in closely stopped phials."

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[1] Tartrate de Fer et de Potasse (*F.*) Eissenweinstein (*I.*) Tartrato di Potassa e di Ossido di Ferro (*G.*)

[2] It is remarkable that both the London and Dublin Colleges should err in giving a name to this triple salt so dissonant to the principles of the reformed nomenclature of their pharmacopœias.

Of these three processes, those of the Edinburgh and the Dublin Colleges are to be preferred, as they afford a perfect triple salt; whereas much of the iron employed in the London process remains unaltered, or is at least only in the form of a simple oxide. In the London process, the iron is first oxidized by the partial decomposition of the water, aided by the action of the air, and the oxide thus formed unites with the superabundant acid of the supertartrate of potash: hence the dried mass consists of tartrate of potash and iron, mixed with oxide of iron, and some metallic iron. The subsequent addition of water, and re-exposure to the air, are intended to render the oxidizement complete, and convert the whole to the state of the triple salt; but as this is not effected, it is probable that the proportion of supertartrate of potash ordered, is insufficient for the large quantity of the metal directed to be used. In the Edinburgh and Dublin processes, the superabundant acid of the supertartrate of potash dissolves as much of the oxide of the carbonate of iron as it can take up; and a clear solution is obtained, which, by evaporation, yields a true tartrate of potash and iron. As it is almost impossible to procure this salt in crystals, the solution may be evaporated to dryness.

Qualities.—Tartrate of potash and iron is inodorous, has a slightly styptic taste, and is of a brownish green colour. It is very soluble in water, and deliquesces, in some degree, when exposed to the air, so as to require to be kept in closely stopped phials. The cold solution of the alkalies and their subcarbonates do not decompose this salt; but it is instantly decomposed when boiled with any of them except ammonia and its subcarbonate, which in neither state affect it. The hydrosulphuret of potash and infusions of astringent vegetables decompose it, and are therefore incompatible in formulæ with it.

Medical properties and uses.—This salt possesses the same medicinal powers as the other preparations of iron; but from its mildness, slight taste, and ready solubility, it is a more convenient form for the administration of this metal to children, and in many cases in which the other saline preparations of it prove nauseating, and sit uneasy on the stomach. It is advantageously given in all the cases in which chalybeates prove useful: and is also extolled as a remedy in dropsy, in which it is supposed to exert both a diuretic and a tonic power. The dose is from grs. x. to ʒſs, given either in a state of solution, or in the form of powder or bolus, combined with an aromatic, or bitter.

LIQUOR FERRI ALKALINI. Lond.[1] *Solution of Alcaline Iron.*[2]

"Take of iron, *two drachms and an half*; nitric acid, *two fluid ounces*; distilled water, *six fluid ounces*; solution of subcarbonate of potash, *six fluid ounces*. Mix together the acid and the water, pour the mixture over the iron, and when the effervescence has ceased pour off the acid solution. Add this gradually, and at intervals, to the solution of subcarbonate of potash, frequently agitating until it become of a brownish red colour, and no more effervescence is excited. Finally, set it aside for six hours, and pour off the liquor."

Although this composition has been long known, yet it is not well understood. The diluted acid[3] acts violently upon the iron and oxidizes it, while heat is evolved, and red fumes are extricated, consisting of nitrous gas and nitrous oxide. If this action be moderated by the iron being in a lump, and putting the vessel in which it is dissolving into cold water, the solution is of a pale green colour, and the iron is at the minimum of oxidizement; but if heat be applied, or the effervescence be allowed to proceed with violence, the solution is of a reddish brown colour, and contains oxynitrate of iron; a great excess of acid being present in both cases. On each addition of the solution of the subcarbonate of potash to either of these solutions, effervescence is excited by the disengagement of carbonic acid, and a red precipitate is instantly produced, which is however kept suspended by agitation, and ultimately redissolved by the excess of alkali. By allowing the mixture to stand for six hours as directed, particularly if the weather be cold, the whole becomes involved in a spongy mass of acicular crystals of nitrate of potash, from which the alkaline metallic solution is to be poured off: it is clear, and of a deep brownish red colour, if the acid solution contain the metal at the minimum of oxidizement: but if at the maximum, it is turbid and of a redder hue. The first of these is the preparation of the London College.

Qualities. — This preparation has an alkaline, slightly styptic taste, and excites the sensation of coldness in the mouth produced by nitrate of potash, but in an inferior degree. The metallic part is precipitated by water[4]; and the clear supernatant fluid, when evaporated, yields crystals of nitrate of potash, proving that the solution contains this salt mixed with the alkaline oxide of iron, if not a nitrate of potash and iron. On the addition of alcohol to this solution the whole of the solid ingredients are thrown down in a concreted mass; it is also decomposed by the strong acids, and the pure alkalies; and after being kept for some time, if not very well excluded from the air, it becomes gradually turbid, perhaps owing to the abstraction of oxygen from the atmosphere more completely oxidizing the metal, and much of the oxide is deposited.

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[1] Teinture martiale alkaline de Stahl (*F.*) Tintura di marte alkalina de Stahl (*I.*)

[2] This name has been justly criticised, as implying an unknown substance, "*alkaline iron*;" it should have been, Liquor alkalinus ferri oxidi.

[3] The concentrated acid scarcely acts on iron.

[4] This precipitate, when the iron has been rapidly dissolved in the acid and heat employed, is a combination of peroxide of iron and carbonic acid. It effervesces strongly with muriatic acid, and gives off carbonic acid during the solution.

Medical properties and uses.— This solution very probably agrees with the other preparations of iron in its medicinal properties; but, setting aside the difficulty of procuring it always of an uniform strength, and the many circumstances in conducting the process, that may alter altogether the natureof the product, we do not know in what mode it can be given; as water, and consequently all infusions and decoctions decompose it, and precipitate the metal. It is therefore difficult to conceive for what purpose it has been introduced into the London Pharmacopœia.

TINCTURA FERRI AMMONIATI. Lond. *Tincture of ammoniated iron.*

" Take of ammoniated iron, *four ounces;* proof spirit, *a pint.* Digest and filter." This being merely a spirituous solution of ammoniated iron, it seems to be unnecessarily introduced into the pharmacopœia by the London College.

TINCTURA FERRI MURIATIS.[1] Lond. *Tincture of Muriate of Iron.*

" Take of carbonate of iron, *half a pound;* muriatic acid, *a pint;* rectified spirit, *three pints.* Pour the acid over the carbonate of iron, in a glass vessel, and shake them occasionally for three days. Set apart the liquor, that the fæces, if there be any, may subside; then pour off the solution, and add the spirit to it."

Edinburgh.

" Take of black oxide of iron, purified and reduced to powder, *three ounces;* muriatic acid, about *ten ounces,* or as much as may be sufficient to dissolve the powder. Digest with a gentle heat, and the powder being dissolved, add as much alcohol as will make the whole liquor amount to two pounds and a half."

Dublin.

" Take of rust of iron, *half a pound;* muriatic acid, *three pounds;* rectified spirits of wine, *three pints.* Put the rust into a glass vessel, pour on the acid, and agitate it occasionally; then set it aside that the fæces may subside, and pour off the liquor: evaporate this slowly, to *one pint*, and when it is cold, add the spirit."

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[1] Koch salzaure Eissentinktur (*G.*) Tinctura di muriato di Ferro (*I.*)

TINCTURA MURIATIS FERRI CUM OXIDO RUBRO. Dub. *Tincture of Muriate of Iron, with the Red Oxide.*

"Take of red oxide of iron, *an ounce*; muriatic acid, *four fluid ounces*; rectified spirit of wine, *a sufficient quantity.* Digest the oxide with the acid for twenty-four hours; then boil the solution for half an hour; evaporate the filtered solution to the thickness of honey, and when it is cold, add rectified spirits of wine, with frequent agitation, until the specific gravity of the tincture be, to that of distilled water, as 1050 to 1000."

Of the formulæ given for the preparation of this tincture, those of the London and the Dublin pharmacopœias are to be preferred. The metal, as ordered in them, is in a higher state of oxidizement, and forms at once, by its combination with the acid, an uniform compound soluble in alcohol; whereas, by following the Edinburgh process, the solution is a mixture of the above muriate, and of the less soluble or green muriate[1], the black oxide not being all completely oxidized; and it is not till after the exposure to air, and by attracting oxygen, that it is converted altogether into the more soluble muriate. Hence the Edinburgh preparation cannot be always of an uniform and fixed strength, which, for an active medicine, is a matter of much importance. The introduction of the last preparation by the Dublin College is superfluous.

Qualities. — The alcoholic solution of muriate of iron is of a brownish yellow colour, has a peculiar odour and a very styptic taste. It contains the iron in a state of oxymuriate; and when it is distilled, this acid comes over, and leaves a black oxide of iron in the retort. With the alkalies and their carbonates it gives a red precipitate; strikes a black colour with infusions of astringent vegetables; and forms with mucilage of acacia gum, an orange-coloured jelly. Hence these substances cannot enter into compositions with this tincture.

Medical properties and uses. — This is an active and elegant preparation of iron, well adapted for all the diseases in which chalybeates prove serviceable. It is also recommended in dysury depending on spasmodic stricture of the urethra, in which case it is given in doses of five or six drops, repeated every ten or fifteen minutes, until nausea be induced. It is also used externally, as a styptic in cancerous and loose fungous sores. The usual dose is from ♏ x. to ♏ xxx. in a glass of water: but it may be gradually increased to ♏ cxx.

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[1] When iron filings are dissolved in muriatic acid, and completely excluded from the air, a muriate is formed insoluble in spirit of wine. *Davy's Researches*, p. 180.

ACETAS FERRI. Dub.[1] *Acetate of Iron.*

"Take of carbonate of iron, *half an ounce*; acetic acid, *three fluid ounces.* Digest for three days, and filter."

This preparation is a mild and efficacious chalybeate; but if the variety of forms in which iron is ordered to be prepared for medicinal purposes be considered, it will obviously appear to be superfluous.

TINCTURA ACETATIS FERRI.[2] Dub. *Tincture of Acetate of Iron.*

"Take of acetate of kali, *two ounces;* sulphate of iron, *one ounce;* rectified spirit of wine, *two pints.* Rub together the acetate of kali and the sulphate of iron, in a stone-ware mortar, until they unite into a soft mass; dry this with a moderate heat, and triturate it with the spirit; then put the mixture into a phial; cork it closely, and digest for *seven days*, frequently shaking it: finally, pour the clear tincture from off the fæces."

TINCTURA ACETATIS FERRI CUM ALCOHOLE. Dub. *Tincture of Acetate of Iron with Alcohol.*

"Take of sulphate of iron, acetate of kali, each *an ounce;* alcohol, *two pints.* Rub together the acetate of kali and the sulphate of iron in a stone-ware mortar, until they unite into a soft mass; then dry this with a moderate heat, and when it is cold, triturate it with the alcohol. Put the mixture into a phial, cork it closely, and digest for *twenty-four hours*, frequently shaking it; finally, pour the clear tincture from off the fæces."

These two preparations differ in scarcely any thing except strength; the theory of the formation of the acetate of iron being the same in both cases. During the process a double decomposition takes place; the sulphuric acid of the sulphate of iron leaves the iron and unites with the potash of the acetate of potash, while the disengaged acetic acid of the latter salt combines with the iron, forming acetate of iron, which is soluble in the alcohol. It is also probable that the oxide of iron absorbs oxygen during the trituration, and being thus more completely oxidized, the mass must contain, instead of an acetate, an oxyacetate of iron, which is more readily dissolved in the alcohol. The sulphate of potash remains undissolved in both processes, with a small portion of uncombined oxide of iron, in the form of a brownish precipitate.

Qualities.—These tinctures have a peculiar odour, a warm styptic taste, and a reddish-brown colour. They are decomposed by the alkalies and their carbonates, and the strong acids, and by infusions of astringent vegetables, which are therefore incompatible in formulæ with them.

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[1] Acetate de Fer (*F.*) Acetato di Ferro (*I.*)

[2] Teinture de l'acetate de Fer (*F.*) Tinturo di marte astringente (*I.*)

Medical properties and uses.—These spirituous solutions of acetate of iron possess the same properties as the other preparations of this metal; but if the introduction of the simple acetate be superfluous, the double form of its spirituous solution is still more objectionable. Indeed, every advantage that can be expected from any of these forms of the acetate can be equally obtained from the tartrate of iron and potash (*ferrum tartarizatum*). And we cannot conceive that any particular benefit can result to practice from loading the list of remedies with all the multifarious states of combination of which the same substance is susceptible. The dose of either of these tinctures may be from ♏x. to f℥j. given in a sufficient quantity of water, or any other proper vehicle.

VI′NUM FER′RI. Lond. *Wine of Iron.*[1]

"Take of filings of iron, *two ounces*; wine, *two pints*. Mix them, and set the mixture aside for a month, occasionally shaking it; then filter it through paper."

Dublin.

"Take of iron wire cut in pieces, *four ounces*; white Rhenish wine, *four pints*. Sprinkle a little of the wine over the iron filings, and expose them to the air, until they be covered with rust, then add the remainder of the wine; digest for seven days, frequently agitating; and, lastly, filter."

As the iron is oxidized and dissolved in the wine by the tartaric acid of the supertartrate of potash it contains, the Rhenish wine ordered by the Dublin Pharmacopœia will be found to answer better for this preparation than the sherry directed by the London College. It is therefore a vinous solution of tartrate of iron and potash; and when prepared in the mode ordered by the London College, each pint contains about grs. xxij. of oxide of iron. The strength, however, must altogether depend upon the state of the wine: andit is to be regretted that the College did not follow the same plan it adopted for the solution of ammoniated copper, and employ a given portion of *ferrum tartarizatum*, which readily dissolves in wine, and forms a permanent solution.

Medical properties and uses.—This is the least unpleasant of the preparations of iron. It is chiefly employed in chlorosis, and the relaxed habits of young females. The dose is from f℥j. to f℥vj. given twice or three times a day.

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[1] Vinum chalybeatum, P. L. 1745. Eissenwein (*G.*)

PRÆPARATA EX HYDRARGYRO.

PREPARATIONS OF MERCURY.

HYDRAR'GYRI NITRICO-OX'YDUM. Lond. *Nitric Oxide of Mercury.*[1]

"Take of purified mercury, *three pounds;* nitric acid (by weight) *a pound and a half*; distilled water, *two pints.* Mix them in a glass vessel, and boil until the mercury be dissolved, and a white mass remains after the evaporation of the water. Rub this into powder, and put it into another vessel very shallow; then expose it to a gentle heat, and gradually raise the fire until it cease to emit red vapours.

OXYDUM HYDRARGYRI RUBRUM PER ACIDUM NITRICUM. Edin. *Red Oxide of Mercury by nitric Acid.*

"Take of purified mercury, *three parts*; diluted nitrous acid, *four parts.* Dissolve the mercury, and evaporate the solution over a gentle fire to a white dry mass, which being rubbed to a powder, is to be put into a glass cucurbite, and covered with a thick plate of glass. Then adapt a capital to the vessel, and having placed it in a sand-bath, let the contained matter be roasted with a fire gradually raised until it pass into small very red scales."

OXYDUM HYDRARGYRI NITRICUM. Dub. *Nitric Oxide of Mercury.*

"Take of purified mercury, *ten ounces*; diluted nitrous acid, *ten fluid ounces.* Let them be mixed in a glass, and the mercury dissolved with a gradually raised heat; then increase the fire until the residuary matter in the bottom of the vessel be converted into red scales."

In this process the mercury is first oxidized at the expense of part of the acid employed, and the oxide, which is in a high state of oxidizement, combines with the undecomposed acid, so as to form a nitrate of mercury. By augmenting the heat, this nitrate is decomposed, the acid and water are nearly altogether expelled, and the oxide is left of a bright red colour, or rather the subnitrate, for it is combined with a small portion of acid. However simple the process may appear to be, yet it has been always found difficult to produce the bright red scaly appearance, which the product should have when it is properly prepared. Much of the success of the process appears to depend on the purity of the acid; the proper regulation of the heat, which, at the utmost, should not be 600°[1]; and the scale on which it is formed, the heat being more steadily maintained, and acting with more uniformity, on a large than on a small quantity of materials. Hence the red precipitate prepared in Holland, where it is manufactured largely, has always been considered better than any prepared in this country. The proportions used by the Dutch chemists are 50 pounds of pure mercury, and 70 of pure nitrous acid of a specific gravity 1·3. The decomposition is conducted in very large flat vessels, the fire being raised when the gaseous nitrous acid ceases to be sensibly disengaged; and the test of its perfection is the inflammation of a match which has been just blown out, by introducing it into the vapour arising from the decomposing oxide.[2]

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[1] Hydrargyrus nitratus ruber, P. L. 1787. Oxide mercure rouge par l'acide nitrique (*F.*) Rother präcipitat. (*G.*) Mercurio Precipitato Rosso (*I.*)

Qualities. — When properly prepared, this subnitrate of mercury is in small scales of a bright red colour, very acrid and corrosive; insoluble in water, but totally soluble in nitric acid without effervescence. It is completely volatilized in a red heat, and at the same time decomposed. We have found the observation of Dr. Murray correct, that "if the preparation be boiled for a short time with five or six times its weight of water, the liquor, when filtered, has the styptic metallic taste, and gives a white precipitate with water of ammonia or carbonate of potash; a plain proof that it holds dissolved nitrate of mercury."[3] According to Paysse, 100 parts contain 82 of mercury, and 18 of oxygen. It is sometimes adulterated with red oxide of lead, which may be detected by dissolving one part of the oxide in four of acetic acid; if lead be present, the solution has a sweetish taste; and when sulphureted water is dropped into it, a dirty dark precipitate is thrown down.

Medical properties and uses. — Nitric oxide of mercury is stimulant and escharotic. It is an external application only, being used, when rubbed into a fine powder, as a stimulant to old sores, and for destroying fungus. As a powder, in the proportion of gr. ſs to grs. iv. of sugar, it is blown into the eye to remove specks on the cornea; and formed into an ointment with lard, it is an useful application to ulcerations of the eyelids, and to chancres.

Officinal preparation. *Unguentum Hydrargyri Nitrico-oxidi.* L. E. D.

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[1] Higgins, *Essays*, i. 183.

M. Payssè, *Annales de Chimie*, li. 202.

System of Materia Medica, ii. 329. Dr. Murray suggests, that it should have been named *Subnitras Hydrargyri ruber.*

ACETAS HYDRARGYRI. Edin.[1] *Acetate of Mercury.*

"Take of purified mercury, *three ounces;* diluted nitrous acid, *four ounces and a half, or a little more than may be required for dissolving the mercury;* acetate of potash, *three ounces;* boiling water, *eight pounds.* Mix the mercury with the acid; and, towards the cessation of the effervescence, digest, if necessary, until the mercury be completely dissolved. Then dissolve the acetate of potash in the boiling water; and immediately to this solution, still hot, add the former, and mix them together by agitation. Set the mixture aside to crystallize; then wash the crystals placed in a funnel with cold distilled water; and finally dry them with a very gentle heat.

"In preparing acetate of mercury, it is necessary that all the vessels, and the funnel, which are used, be of glass."

ACETAS HYDRARGYRI. Dub. *Acetate of Mercury.*

"Take of purified mercury, *three ounces;* diluted nitrous acid, *three fluid ounces;* acetate of kali, *three ounces;* boiling distilled water, *eight pints.* Add the acid to the mercury, and when the effervescence is over, digest upon hot sand, that the metal may be dissolved; mix this solution immediately with the boiling water in which the acetate of kali has been previously dissolved, and then let the mixture be passed as quickly as possible through a double linen cloth. Cool it, that crystals may form; wash these with cold distilled water, and dry them upon paper with a very gentle heat.

"In the whole of this process glass vessels must be used."

Acetic acid scarcely acts on mercury, but by either of the above processes the acetate may be formed. Nitrate of mercury is first obtained by the action of the nitric acid on the mercury; and this is decomposed by the acetate of potash, the alkali of which unites with the acid of the metallic salt, and forms nitrate of potash, which remains in solution; while the disengaged acetic acid combines with the oxide of mercury, and forms the acetate of mercury, which readily crystallizes, and is thus easily separated. By preparing the solution of the nitrate of mercury with a gentle heat, when there is an excess of acid, the portion of mild acetate of mercury produced is considerable; but if the quantity of acid be sufficient for the saturation only of the oxide, a sudden decomposition of the solution is effected by the hot water which contains the acetate of potash in solution, independent of the action of the acetate, and a subnitrate of mercury of a yellow colour is precipitated. Hence the propriety of the direction of the Edinburgh College to use more acid "than is required for dissolving the mercury." It is of much importance also that the degree of heat be low;

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[1] Acetate de Mercure (*F.*) Essigsaures Quecksilber (*G.*) Acetato di Mercurio (*I.*)

for if a high temperature be employed, the metal is oxidized to a maximum, and the product of the subsequent part of the process is an oxyacetate, which is very acrid and soluble, instead of the salt intended to be produced. For the success of the process, which often fails, the solution of the acetate of potash should not be used immediately after it is made, but should be scarcely more than tepid when it is mixed with the solution of nitrate of mercury; and to the water employed for washing the salt, should be added about fʒj. of distilled vinegar for every Ofs of water; which prevents the partial decomposition of the acetate, and the consequent yellow colour of the crystals, that sometimes occur in the washing.

Qualities. — This salt, when properly prepared, is in small flat crystals, of a silvery whiteness, acrid to the taste, soluble in hot water, but scarcely soluble in cold water; and having an acrid taste. It is insoluble in alcohol. The alkalies decompose it, and it is readily decomposed by heat. Light also has this effect, blackening the salt. The proportion of its constituents has not yet been ascertained.

Medical properties and uses. — Acetate of mercury is antisyphilitic and alterative; but it is scarcely ever used, unless as the active ingredient of Keyser's pills. As an external application, a solution of it, in the proportion of grs. ij. in f℥ij. of rose water, is used in some cutaneous affections. The internal dose is gr. j, night and morning.

HYDRARGYRI OXYDUM CINEREUM. [1]Lond.

Grey Oxide of Mercury.

"Take of submuriate of mercury, *an ounce;* lime-water, *a gallon.* Boil the submuriate of mercury in the lime-water, stirring it assiduously, until the grey oxide of mercury subside. Wash this with distilled water, and then dry it."

OXIDUM HYDRARGYRI CINEREUM. Edin. *Grey Oxide of Mercury.*

"Take of submuriate of mercury, *half an ounce;* lime-water *five pounds.* Boil the submuriate in the solution, for a quarter of an hour in a slightly covered vessel. Pour off the supernatant fluid, then wash the oxide with distilled water; and dry it."

PULVIS HYDRARGYRI CINEREUS. Dub. *Grey Powder of Mercury.*

"Take of mercury, *two ounces;* diluted nitrous acid, *two fluid ounces;* dissolve the mercury in a slow heat, and dilute the solution with *eight fluid ounces* of cold water; then drop into it *one ounce and a half* of the water of carbonate of ammonia, or as much as may be sufficient for precipitating the whole of the metal, which is to be washed with boiling distilled water, until the poured off fluid yield no sediment when water of sulphuret of ammonia is dropped into it. Finally, let the precipitate be dried."

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[1] Oxide gris de Mercure (*F.*) Schwarzes gesauertes Quecksilber (*G.*) Protossido einereo di Mercurio (*I.*)

The appellations given to these preparations would lead to the supposition that they were essentially the same, although the Dublin process differs from the other two; and scarcely any difference, indeed, exists between the products of the three processes, when they are properly conducted. In the London and Edinburgh processes, the lime-water decomposes the mercurial salt, its lime unites with the acid of the mild muriate, and the insoluble oxide, which is at a low state of oxidizement, remains of a greyish colour, while the muriate of lime which is formed, being soluble, is easily separated by washing. In the Dublin process it is intended, first, to produce a nitrate of mercury with the metal, at a low state of oxidizement; so that by the addition of the carbonate of ammonia a decomposition may be effected, and grey oxide of mercury, and muriate of ammonia formed, which are to be separated by the subsequent washings. But if the nitrate of mercury be formed, with the assistance of heat, as ordered by the Dublin College; or even if the solution be quickly made without heat, the metal becomes too highly oxidized, and the result is not the grey oxide, which the College intends should be produced, but is a mixture of the grey oxide, and a triple compound of oxide, mercury, ammonia, and nitric acid.[1] The directions of this formula are not sufficiently distinct to produce the effect intended; and, therefore, the following directions given by Hahneman for this preparation are absolutely necessary to be followed for obtaining the grey oxide in a purer form. Dilute the acid with two parts of water, and add the mercury in small quantities at a time, placing the vessel in cold water to moderate the rise of temperature during the solution, which thus proceeds very slowly. When the acid has taken up as much of the metal as will saturate it, dilute the solution with twenty parts of distilled water, and drop in solution of ammonia as long as any precipitate is produced. Wash the precipitate immediately in water, and dry it on bibulous paper before the fire.[2] The same effect is produced if subcarbonates of ammonia be used, the carbonic acid being disengaged.

Qualities. — Grey oxide of mercury, properly prepared, is in the form of an impalpable blackish grey-coloured powder, which becomes paler if exposed to air and light. It is inodorous, insipid, and insoluble in water. In the state in which it is usually found in the shops, it is of a light grey colour, almost approaching to a white, in which state it contains the triple salt above mentioned. When prepared according to the London formula, it has been supposed[1], that the lime not being able to abstract the whole of the acid, the product is strictly a submuriate of mercury. We find, from experiment, that this is actually the case, and it is not improbable that a minute portion of the lime may also be precipitated in the state of carbonate. The constituents of the grey oxide are supposed to be 96 parts of mercury, and 4 of oxygen, in 100 parts.[2]

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[1] *Green's Chemistry*, (translation.) ii. 230.

[2] *Murray's Chemistry*, 2d edit. iii. 178.

Medical properties and uses. — The grey oxide of mercury, when well prepared, may be used as a substitute for the oxide prepared by trituration; and as it is more likely to be always of an uniform strength, it may of course be more depended on than that preparation. It has been, however, objected to for forming ointment for the purposes of mercurial frictions; (see *Ung. Oxydi Hydrargyri cinerei*) — but perhaps the objections have originated from that form of the preparation having been used which contains the triple salt. We have seen it used with advantage for fumigation, both locally applied to assist the healing of venereal ulcers; and, generally, to bring the habit under the influence of mercury, when it could not be introduced by the ordinary mode. The dose of this oxide is from gr. i. to grs. iij. given in the form of pill twice a day.

Officinal preparation. *Unguentum Oxidi Hydrargyri cinerei.* E.

HYDRARGYRI OXYDUM RUBRUM. Lond.[3] *Red Oxide of Mercury.*

"Take of purified mercury, *a pound.* Put the mercury into a glass vessel with a narrow mouth and broad at the bottom. Expose this vessel open to a heat of 600°, until the mercury be converted into red scales; then rub these to a fine powder."

OXYDUM HYDRARGYRI. Dub. *Oxide of Mercury.*

"Take of purified mercury, *any quantity.* Put it into an open glass vessel with a narrow mouth and a broader bottom, and expose it to a heat of about 600°, until it be converted into red scales."

In this process the mercury is brought nearly to the boiling point[4], so as to be volatilized, in which state it decomposes atmospherical air attracting its oxygen, and is converted into a red oxide. A small quantity of mercury requires several weeks to be thus oxidized; and therefore as much only is introduced into the vessel as can cover the bottom of it; and both on this account, and in order to prevent the dissipation of the volatilized metal, the shape of the vessel is of some importance. It should have a wide bottom and a long neck, the extremity of which is extended almost to a point; and it should be heated in a sand-bath, the sand not rising higher round the vessel than the mercury stands within it. By keeping up a steady heat, a constant circulation of the mercurial vapour is kept up in the upper part of the matrass, and as it combines with oxygen, a dull film first forms on the surface of the mercury, which is next converted into a black powder, and then into red shining scales. A part of the mercury is always lost; and as the process requires much attention, and so long a time for its completion, the preparation is necessarily expensive.

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[1] *Murray's System of Materia Medica*, ii. 326.

[2] Fourcroy.

[3] Hydrargyrus calcinatus, P. L. 1787. Oxide de Mercure rouge par le feu (*F.*) Rothes Quecksilberoxyd (*G.*) Perossido rosso di Mercurio (*I.*)

[4] Irvine makes the boiling point of mercury to be 672°; Crichton, 655°; and Dalton, 660°.

Qualities.—Red oxide of mercury is obtained in the form of minute, crystalline, very brilliant, sparkling, deep red scales, inodorous, but acrid and caustic, although less so than the former preparation. It is soluble in several of the acids without decomposition. It is soluble in water also, and the solution changes to green the syrup of violets. When rubbed with running mercury, both are changed into black oxide; and when heated to ignition in a glass retort, it is decomposed; very pure oxygen being obtained, and the metal again returns to the state of running mercury. According to Lavoisier, 100 parts of this oxide contain 7 of oxygen; Fourcroy makes the proportion of oxygen 8; and Chenevix, 15 parts. The light partially decomposes the red oxide, hence it should be kept in opaque bottles.

Medical properties and uses.—This is a very active preparation of mercury, and has been employed by some very celebrated practitioners[1] as an internal remedy in syphilis. It is, however, very apt to vomit, purge, and otherwise violently affect the stomach and bowels; consequently it is now scarcely ever exhibited internally, or employed as an antisyphilitic. The dose may be gr. j. combined with gr. ſs. of opium, in the form of pill, night and morning. It is chiefly used as an external stimulant, and escharotic in the same cases as the nitric oxide; being previously rubbed to a fine powder, and either sprinkled over the ulcers; or united with lard, and applied as an ointment.

HYDRARGYRI OXYMURIAS. Lond.[2] *Oxymuriate of Mercury.*

"Take of purified mercury, *two pounds;* sulphuric acid, *thirty ounces* (by weight); dried muriate of soda, *four pounds.* Boil the mercury with the sulphuric acid in a glass vessel, until the sulphate of mercury becomes dry: rub this, when it is cold, with the muriate of soda in an earthen-ware mortar; then sublime it in a glass cucurbit with a gradually raised heat."

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[1] John Hunter.

[2] *Syn.* Muriate de Mercure corrosif (*F.*) Azzendes alssaures Quecksilber (*G.*) Mercurio sublimato corrosivo (*I.*)

MURIAS HYDRARGYRI CORROSIVUS. Edin. *Corrosive Muriate of Mercury.*

"Take of purified mercury, *two pounds;* sulphuric acid, *two pounds and a half;* dried muriate of soda, *four pounds.* Boil the mercury with the sulphuric acid in a glass vessel placed in a sand-bath, until the matter becomes dry. Mix this, when it is cold, in a glass vessel, with the muriate of soda; then sublime in a glass cucurbit with a gradually raised heat. Separate the sublimed matter from the scoriæ."

MURIAS HYDRARGYRI CORROSIVUM. Dub. *Corrosive Muriate of Mercury.*

"Take of purified mercury *two pounds*; sulphuric acid, *three pounds*; dried muriate of soda, *two pounds and a half.* Dissolve the mercury in the acid, and gradually increase the heat until the matter become almost dry; let this, when it is cold, be rubbed with the muriate of soda in an earthen-ware mortar; and then sublime it in a proper vessel with a gradually raised heat."

Sulphuric acid does not act upon mercury at a low temperature; but when three parts of this acid are boiled upon two of mercury, the metal decomposes the acid, and is oxidized, sulphurous gas being emitted with effervescence; and there remains a dry mass of a fine white colour, which is an oxysulphate of mercury combined with an excess of acid. By triturating this salt with dried muriate of soda, and exposing the mixture to heat, a double decomposition is effected; the muriatic acid leaves the soda, and combines with the oxide of mercury of the oxysulphate, while the sulphuric acid unites with the soda, thus forming muriate of mercury and sulphate of soda, the former of which, being easily volatilized, is separated from the latter by sublimation. This process was first proposed by Kunkel, but no salt has been prepared by a greater variety of methods; and as it is now generally manufactured on the large scale, the proportions of the ingredients ordered by the Colleges are perhaps but seldom adopted. Of the three formulæ of the British Colleges, however, that of the Dublin College is to be preferred, as by the larger proportion of sulphuric acid, and the smaller of muriate of soda, a more complete decomposition of the muriate of soda is effected; and consequently a greater quantity of muriatic acid being evolved, a larger proportion of the oxide of mercury must necessarily be converted into muriate. Sixteen ounces of mercury should yield about ℥xx. of corrosive muriate. The most simple process, and perhaps the best, is the direct solution of the red oxide of mercury in muriatic acid, by which the salt is obtained by spontaneous crystallization[1]; but it is too expensive for general purposes.

Qualities.—Corrosive muriate of mercury[2] is obtained by the above processes in the form of a white, shining, semi-transparent, easily pulverized mass, made up of small acicular crystals. When the process is very carefully and slowly conducted, the crystals are separate, regular, tetrahedrous, compressed and pointed. On exposure to the air the mass effloresces on the surface. Its specific gravity is 5·1398. It is inodorous, and has a very acrid, disagreeable metallic taste; changes to green several of the vegetable colours; is soluble in 11 parts of water at 60°, two parts at 212°, and in 4 parts of alcohol at 60°. It is soluble also in the sulphuric, nitric, and muriatic acids, and may be again obtained unaltered by evaporating the solutions. The fixed alkalies and alkaline earths decompose it, precipitating it from its solution of an orange-yellow colour, which becomes brick-red. It is also partially decomposed by exposure to light, and by some metals; and changed into calomel.[3] The carbonates of the fixed alkalies precipitate it of a fixed yellow hue, and ammonia forms with it a white triple insoluble compound, containing muriate of ammonia and oxide of mercury. When triturated with olive oil, the oil is whitened; and when boiled with it, a small portion of calomel is thrown down; and the same is the case when it is boiled with sugar. The volatile oils reduce it. It is also decomposed by solutions of tartrate of potash and antimony; nitrate of silver and superacetate of lead; and forms precipitates in infusions and decoctions of the following vegetable substances; chamomile flowers, horse-radish root, columba root, catechu, cinchona bark, rhubarb root, senna leaves, simaruba bark, oak bark, tea, and in the almond mixture: consequently, it is incompatible in extemporaneous formulæ with these substances. Mr. Chenevix made the first correct analysis of this salt: according to him, 100 grains of it consist of 18 parts of muriatic acid, and 82 of an oxide of mercury composed of 12·3 of oxygen and 69·7 of mercury[4]; but a more recent analysis of Zaboada makes the proportions 19·5 of acid, and 80·5 of oxide consisting of 8·5 of oxygen and 71·5 of mercury.[1] It should be preserved in opaque bottles.

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[1] *Annales de Chimie*, xxviii. 12.

[2] This appellation, which is that of the Edinburgh and Dublin Colleges, is certainly preferable to that of the London College. But as the name *oxymuriate* is improper in a strictly chemical sense, perhaps the name *deuto muriate of mercury*, which most justly designates its chemical character, would be less exceptionable than any other. The old names were, *Hydrargyrus muriatus*, *Mercurius sublimatus corrosivus*.

[3] Mr. Chenevix found, "that if a bit of copper be put into a solution of corrosive sublimate, a white powder shortly falls to the bottom, and that powder is calomel. When washed, it does not contain an atom of copper, nor of corrosive sublimate."

[4] *Phil. Trans.* 1802, part i. 157.

Medical properties and uses.—This salt has been long known to chemists.[2] It is a powerful stimulant and alterative; and in large doses is one of the most violent of the metallic poisons. As an antisyphilitic it was early much extolled, and is the active ingredient of many a celebrated empirical nostrum; but modern practice has fixed its real merits much lower than they were formerly placed. When taken in over-doses, either by mistake, or designedly as a poison, the best antidote is white of egg *diluted* with water, and given in large frequently repeated doses. The albumen decomposes the corrosive muriate, reducing it to the state of the mild muriate, while the compound which it forms with it exerts no deleterious effect on the stomach.[3] The presence of corrosive sublimate in any solution suspected to contain it may be detected by putting into the fluid a small piece of clean polished copper, which, if the poison be present, will be covered with a white coating, or white streaks that acquire a metallic lustre when rubbed. It sometimes succeeds in curing the primary symptoms of syphilis, but as often fails; and although it checks the progress of the secondary symptoms, relieving venereal pains, and healing ulcers of the throat, "yet even in these cases," says Mr. Pearson, "it never confers permanent benefit; for new symptoms will appear during the use of it; and on many occasions it will fail of affording the least advantage to the patient from first to last."[4] It is given with more advantage in some other affections, as old ulcers, chronic rheumatism, and in cutaneous diseases, particularly lepra, in which Willan says it is the only useful preparation of mercury, "its operation being promoted by giving at the same time an antimonial[5]," and the decoction of the woods. Its sensible operation is by urine; but sometimes it occasions the most violent nausea, griping, and purging, in which cases it should be combined with opium; and it is always necessary to take, during its use, some mucilaginous fluid, to moderate the irritation it is apt to induce. It is also used as an external application. (See the following article.) The dose is from gr. ⅛th to gr. ¼th, twice a day, made into a pill with crumb of bread or extract of poppies.

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[1] *Journal de Physique*, lx. 383.

[2] The preparation is said to have been long known to the Chinese, and it is mentioned by Rhazis and Avicenna Bergman, iv. 281.

[3] Orfila. *Traité des Poisons*, t. i. part i. p. 101.

[4] *Pearson on Remedies for Lues Venerea, &c.* 116.

[5] *Willan on Cutaneous Diseases*, 140.

Officinal preparations. *Liquor Hydrargyri Oxymuriatis.* L. *Hydrargyri Submurias.* L. E. D. *Hydrargyri Precipitatus albus.* L.

HYDRARGYRI SUBMURIAS.[1] Lond. *Submuriate of Mercury.*

Take of oxymuriate of mercury, *a pound*; purified mercury, *nine ounces.* Rub them together until the globules disappear; then sublime; afterwards take out the sublimed matter, reduce it to powder, and again sublime it twice. Finally, reduce it to a very subtile powder, in the same manner which has been directed for the preparation of chalk."

SUBMURIAS HYDRARGYRI MITIS, sive CALOMELAS. Edin. *Mild Submuriate of Mercury,* or *Calomel.*

"Take of muriate of mercury, *four parts;* purified mercury, *three parts.* Rub the muriate in a glass mortar with a little water, in order to prevent the acrid powder from rising, then add the mercury, and again triturate until it be extinguished; put the dried mass into an oblong phial, one-third of which only it shall fill, and sublime it in a sand-bath. Again triturate the sublimate powder, and sublime it, then reduce it to a fine powder, which is lastly, to be well washed with boiling distilled water."

SUBMURIAS HYDRARGYRI SUBLIMATUM, sive CALOMELAS. Dub. *Sublimed Submuriate of Mercury,* or *Calomel.*

"Take of corrosive muriate of mercury, *a pound*; purified mercury, *nine ounces.* Rub them together until the globules disappear, and sublime with a sufficient degree of heat. Le the sublimed matter be rubbed to powder, and again sublimed. Pulverize it, and wash it with frequent affusions of distilled water, until the poured off solution no longer lets any sediment fall on the addition of a few drops of carbonate of kali. Finally, dry it."

This very important preparation is a muriate of mercury, with the metal at a minimum of oxidizement.[2] By triturating the metallic mercury with the corrosive muriate, it is oxidized at the expence of the oxide of this salt, and the whole mass assumes a grey colour. The sublimations render the combination of the new oxide with the acid complete; but this is not the case in the first sublimation; for both metallic mercury and corrosive muriate are found unchanged in the sublimed mass; and hence the necessity of the second trituration and the subsequent sublimations. By repeating, however, the sublimations too often the product is injured, as corrosive muriate is formed in each sublimation, owing to the attraction of oxygen from the air of the apparatus. The final trituration and levigation are intended to separate any corrosive muriate that may have been formed, and the test of the Dublin Pharmacopœia ought always to be had recourse to for ascertaining this point. In performing the process, the addition of a little water during the trituration of the ingredients, in the first instance, is very necessary; as otherwise, the operator is apt to suffer extremely from the acrid powder of the corrosive muriate which is elevated. Mr. Howard has lately proposed the following improvement in the mode of conducting the sublimation, by which the difficulty which attends the grinding and levigation of the mass sublimed in the usual mode is altogether avoided. Instead of subliming so as to obtain the calomel in a concrete form, the vapour, as it rises, is thrown into a vessel containing water, where it instantly condenses in the form of a fine white impalpable powder. It is not, however, certain that the preparation does not suffer some change of composition, as it is lighter than the levigated calomel in the proportion of 3 to 5. It is undoubtedly more free from any combination of corrosive muriate.

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[1] Old names, *Aquila alba, Aquila mitigata, Manna Metallorum, Panchymagogum minerale, Panchymagogus quercetanus, Sublimatum dulce, Mercurius dulcis sublimatus, Calomelas. Syn.* Muriate de Mercure doux (*F.*) Mildes Salzsaures Quecksilber (*G.*) Mercurio dolce sublimato (*I.*)

[2] It is very remarkable that all the Colleges have erred in naming this preparation, which in no point of view can be regarded as a *submuriate,* but is as much a *muriate* as the corrosive sublimate; the sole difference depending on the degree of oxidizement of the metal, which in this preparation is at a minimum. In a medical point of view, we are of opinion that the name *calomel,* however absurd, ought to have been retained, as the syllables *oxy* and *sub* are scarcely sufficient to distinguish the two salts to blundering assistants and apprentices, by whom the most dangerous mistakes may be committed.

Qualities. — Calomel is obtained by the above processes in the form of a dull semitransparent mass, composed, when the sublimation has been slowly conducted, of short prismatic crystals, the specific gravity of which is 7·1758.[1] It is inodorous, insipid, and has a light yellow or ivory colour, which deepens by long exposure to the light. It is regarded as insoluble, one part requiring 1152 of water at 212° for its solution.[2] Nitric acid converts it into corrosive muriate, much nitrous gas being evolved; and the same change is effected by oxymuriatic acid. Lime-water and the alkalies, when triturated with it, instantly render it black, a circumstance which supplies us with a test of its purity, for if it contain any corrosive muriate, a yellow tint is mingled with the black on the addition of lime water. According to Chenevix, 100 parts of it contain, 11·5 of muriatic acid, and 88·5 oxide of mercury, consisting of 79 of mercury and 9·5 of oxygen[1] : but according to Zaboada, the proportions are, 10·6 of acid, and 89·4 of oxide, consisting of 85 of mercury and 4·4 of oxygen.[2]

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[1] *Annales de Chimie*, xxviii. 12.

[2] Rouelle.

Medical properties and uses.— This is the most useful of the preparations of mercury, and is more generally employed than almost any other remedy in the whole range of the materia medica. It is antisyphilitic, antispasmodic, alterative, deobstruent, purgative, and errhine. As a remedy in syphilis, it can be fully confided in, when its disposition to run off by the bowels is counteracted by opium; and in the same state of combination it is also found efficacious in several convulsive affections, as epilepsy, trismus, and tetanus: and in that species of spasmodic stricture which occurs in virulent gonorrhœa. As an alterative and deobstruent, it is employed with advantage in cutaneous eruptions, as lepra, and scabies, in which cases it is combined with antimonials and guaiacum; and in hepatitis, and glandular obstructions: in dropsies it assists the action of squill and fox-glove; and as a purgative it may be employed with safety in almost every form of disease not attended with visceral inflammation, or where there is not great irritability and delicacy of habit. Calomel, however, does not act with certainty as a purgative even in large doses, and hence it is generally combined with scammony, jalap, or some other active cathartic. The usual dose to affect the habit and produce ptyalism is from gr. j. to grs. ij. in a pill with opium, given night and morning; and from grs. iij. to grs. viij. act in general as a purgative: but in some complaints, as yellow fever and croup for example, in which it is supposed to exert a specific effect, this dose has been repeated every two or three hours, until upwards of 100 grains have been taken in a very short space of time.

On account of its insolubility and great specific gravity, it can be given only in the form of pills.

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[1] Comparative Table of the components of Calomel and Corrosive Sublimate.

CALOMEL.		CORROSIVE SUBLIMATE.	
The oxide of mercury in calomel is composed of		The oxide of mercury in corrosive sublimate is composed of	
Mercury - - -	89·3	Mercury - - -	85
Oxygen - - -	10·7	Oxygen - - -	15
	100·0		100
And calomel is composed of		And corrosive sublimate is composed	
Mercury 79 Oxygen 9.5 } Oxide of Mercury	88·5	Mercury 69·7 Oxygen 12·3 } Oxide of mercury -	82
Muriatic acid - -	11·5	Muriatic acid - - -	18
	100·0		100

Chenevix, *Phil. Trans.* 1802, 157.

[2] *Journal de Physique.*

SUBMURIAS HYDRARGYRI PRÆCIPITATUS. Edin. *Precipitated Submuriate of Mercury.*

"Take of diluted nitrous acid, purified mercury, each *eight ounces;* muriate of soda, *four ounces and a half;* boiling water, *eight pounds.* Mix the mercury with the diluted nitrous acid, and towards the termination of the effervescence digest with a gentle heat, frequently shaking the vessel. It is requisite, however, that more mercury be mixed with the acid than it can dissolve, so that a completely saturated solution be obtained.

"Dissolve at the same time the muriate of soda in the boiling water; then to this add the other solution while it is yet warm, and mix them very quickly together. After the precipitate has subsided, pour off the saline fluid, and wash the submuriate of mercury by frequent affusions of warm water, which are to be poured off each time after the precipitate subsides, until the water comes off tasteless."

Submurias Hydrargyri præcipitatum. Dub. *Precipitated Submuriate of Mercury.*

"Take of purified mercury, *seven ounces;* diluted nitrous acid, *five fluid ounces.* Pour the acid upon the mercury in a glass vessel, and when the effervescence has ceased, digest with a gentle heat for six hours, with frequent agitation. Then raise the heat, that the solution may boil a little, which is to be poured off from the residual mercury, and quickly mixed with *ten pounds* of boiling water, in which *four ounces* of muriate of soda have been previously dissolved; wash the powder that subsides with warm distilled water, as long as the fluid poured off from it yields a precipitate on the addition of a few drops of the solution of (*sub*) carbonate of kali; lastly, let it be dried."

These processes are framed on the process originally suggested by Scheele, and the error into which he was led by reasoning from a false analogy has not been corrected by the Colleges; the product of the above process being a mild muriate of mercury mixed with subnitrate of mercury which modifies its powers, a smaller proportion also of mild muriate being obtained than should follow from the quantity of mercury employed. The cause of this effect is, that by dissolving mercury in nitric acid with the assistance of heat, the metal contained in the acid solution is oxidized to a maximum, and when water is added to it, a subnitrate is precipitated, while a supernitrate remains in solution. Hence, on the addition of the watery solution of muriate of soda, the water occasions the subnitrate to be precipitated, before the decomposition which takes place is effected, at the same time part of the oxide combines with the acid of the muriate of soda, and forms a portion of corrosive muriate which is held in solution with the newly formed nitrate of soda, while the mild muriate is precipitated in combination with insoluble subnitrate of mercury.

To obtain, therefore, the greatest proportion of pure mild muriate of mercury by precipitation, the nitrate must be prepared slowly, and without the aid of heat, which should not be employed in any part of the process. Dr. Murray ascertained, that "the quantity of mild muriate obtained from a solution of ℥j. of mercuryin diluted nitric acid in the cold, is a little more than ℥j.; while from the same quantity dissolved with the application of heat, the precipitate did not exceed ℥ſs, while the liquor held dissolved much more corrosive muriate than the other.[1]

Qualities.—Precipitated mild muriate of mercury, when properly prepared, is inodorous and insipid. It is whiter, smoother, and lighter, than the sublimed preparation, but otherwise agrees with it, both in its chemical qualities, and medicinal effects. As prepared, however, according to the directions of the pharmacopœias, subnitrate of mercury, which it contains, may have some effect in altering its powers in a small degree.

Medical properties and uses.—It is said to be more liable to run off by the bowels than common calomel; but as its properties are essentially the same, it may be regarded as a superfluous preparation.

HYDRARGYRI SULPHURE'TUM NIGRUM.[2] Lond.

Black Sulphuret of Mercury.

"Take of purified mercury, *one pound*; sublimed sulphur, *a pound*. Triturate them together until the globules disappear."

SULPHURETUM HYDRARGYRI NIGRUM. Edin. Dub.

Black Sulphuret of Mercury.

"Take of purified mercury, sublimed sulphur, of each *equal weights*. Rub them together in a glass mortar with a glass pestle, until the globules of mercury altogether disappear. It may be made with double the quantity also of mercury."

During the trituration of the mercury with the sulphur, Fourcroy supposes that the metal is imperfectly oxidized by attracting oxygen from the atmosphere; but this opinion has been disproved by the experiments of Proust[3]; and although a chemical combination be effected between the mercury and the sulphur, yet the real nature of the preparation is not understood.

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[1] *System of Materia Medica, &c.* ii. 319.

[2] Hydrargyrus e Sulphure, P. L. 1787. Sulphure de Mercure noir (*F.*) Schwarzes Schwefelquecksilber (*G.*) Solfuro di Mercurio nero (*I.*)

[3] *Journal de Physique*, liii. 92.

Qualities. — Black sulphuret of mercury is in the form of a very black, impalpable, inodorous, insipid powder. When heated in an open vessel it emits sulphurous acid gas; becomes first of a deep violet hue, and afterwards sublimes of a brilliant red colour. It is insoluble in nitric acrid, but is totally dissolved by a solution of pure potash, from which the acids precipitate it unchanged. It is often ill prepared, which may be known by rubbing a portion of it on gold; to which, if it be good, no whiteness will be communicated. It is, also, sometimes adulterated with ivory-black, which may be detected in it by throwing a little of the suspected sulphuret on a red-hot iron; if ivory-black be present, some ashes will be left after the volatilization, which will not be the case, when it is good, the pure sulphuret being completely dissipated.

Medical properties and uses. — This mercurial preparation is alterative and anthelmintic. It is chiefly employed against scrophulous swellings, and in cutaneous affections; and has been found useful in ascarides. But it is on the whole a very uncertain preparation, and requires to be long used to produce any sensible effects. The dose is from grs. v. to ʒſs, given twice or three times a day.

HYDRAR′GYRI SULPHURE′TUM [1]RU′BRUM. Lond. *Red Sulphuret of Mercury.*

"Take of purified mercury, *forty ounces*; sublimed sulphur, *eight ounces*. Having melted the sulphur over the fire, mix in the mercury, and, immediately the mass swells, remove the vessel from the fire, and cover it with force to prevent it from catching fire; then rub it into powder and sublime."

SULPHURATUM HYDRARGYRI RUBRUM. Dub. *Red Sulphuret of Mercury.*

"Take of purified mercury, *forty ounces*; sublimed sulphur, *eight ounces*. Mix the mercury with the melted sulphur; and if the mixture take fire, extinguish it by covering the vessel; then rub the mass to powder, and sublime it."

By these processes the mercury and sulphur are more intimately combined, and a more complete sulphuret produced than in the former preparation. The inflammation which is apt to happen after the mixture of the mercury with the melted sulphur, when the mass swells and explodes, as frequently occurs, is similar to the combustion during the union of sulphur by heat with some other metals, independent of the présence of air: hence, covering the vessel, without removing it from the fire, does not check the combustion, although, by excluding the air, a real inflammation of the materials may be prevented. In the second part of the process great caution is necessary to prevent the neck of the vessel in which it is sublimed from being choaked up by the sublimed sulphuret; as by the occurrence of such an accident the vessel would be burst by the confined vapours. To avoid this, a wide-necked vessel should be used.

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[1] Cinnabaris factitia, P. L. 1745. Hydrargyrus sulphuratus ruber, P. L. 1787. Sulphure de Mercure rouge (*F.*) Zinnober (*G.*) Solfuro di Mercurio rosso (*I.*) Shengerf (*H.*)

The cinnabar of commerce, which is chiefly used as a pigment, is manufactured in Holland, on a very extensive scale[1]; and the following method has been proposed by Mr. Kirchoff, for obtaining it in the humid way. First, form ethiops mineral, by triturating, in a porcelain cup with a glass pestle, 300 grains of mercury, and 68 of sulphur, moistened with a few drops of solution of potash, and then add to it 160 grains of potash, dissolved in an equal weight of water. Heat the vessel with the ingredients over the flame of a candle, continuing the trituration, and adding, as the fluid evaporates, pure water from time to time, so as to keep the ingredients covered to the depth of an inch. At the end of two hours, if the trituration has been continued, the colour of the mixture changes from black to brown, and then to red; after which no more water should be added, but the trituration must be uninterruptedly continued until the mass have acquired the consistence of a jelly, and the red colour attained considerable brightness and beauty: the heat must be then immediately withdrawn, otherwise the red soon changes to a dirty brown.[2]

Qualities. — Red sulphuret of mercury sublimes in the form of a vivid red crystalline cake, and yields, by trituration, a powder of a very bright red colour, which is indorous, insipid, and insoluble in water, alcohol, and the acids. It is decomposed, however, by nitro-muriatic acid, which combines with the mercury, and disengages the sulphur; but is not altered by solutions of the alkalies, even when boiled with them; although potash, soda, and most of the metals decompose it when melted with it. Vauquelin supposed that it contains the metal in a state of high oxidizement; a supposition which the experiments of Proust and Seguin have completely disproved. According to Proust, 100 parts of the sulphuret consist of 85 of unoxidized mercury, and 15 of sulphur; but according to the latter experiments of Guibourt[3], the proportions are 86·1803 of mercury and 13·8197 of sulphur. This preparation is sometimes adulterated with red-lead, dragon's blood, and chalk; the first is discovered by the same process as was described for discovering it in the red oxide; spirit of wine detects the second by extracting the colouring matter; and the last is discovered by an effervescence being excited by muriatic acid; and the production of sulphate of lime on adding sulphuric acid.

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[1] See a description of the method, *Annales de Chimie*, li. 196.

[2] *Nicholson's Journal*, 4to. ii. 1.

[3] *Journ. de Pharmacie*, Aout. 1816. p. 371.

Medical properties and uses. — Red sulphuret of mercury is alterative and deobstruent. It was formerly much used in cutaneous diseases, gouty and rheumatic affections, and in worms. It is now, however, scarcely ever prescribed. It has been recommended for fumigations in syphilis; but on account of the sulphurous vapours it is less fit for this purpose than the grey oxide. The dose for internal use is from grs. x. to ʒſs. made into an electuary or bolus.

SUB-SULPHAS HYDRARGYRI FLAVUS.[1] Edin.

Yellow Sub-Sulphate of Mercury.

"Take of purified mercury, *two parts;* sulphuric acid, *three parts.* Put them into a glass cucurbit, placed in a sand-bath, and boil them to dryness. Pulverize the white mass which is left at the bottom of the vessel, and throw it into boiling water. It will immediately be converted into a yellow powder, which is to be washed with frequent affusions of warm water."

OXYDUM HYDRARGYRI SULPHURICUM. Dub. *Sulphuric Oxide of Mercury.*

"Take of purified mercury, *a pound*; sulphuric acid, *a pound and a half.* Dissolve in a glass vessel, with a sufficiently strong heat, and gradually raise the fire until the mass be completely dried. This, by the affusion of a large quantity of hot water, will immediately become yellow and fall into powder, which is to be well triturated with the water in an earthen-ware mortar.

"After pouring off the supernatant fluid, let the powder be washed with repeated affusions of hot distilled water, as long as any precipitate is produced in the decanted liquor on the addition of a few drops of water of subcarbonate of kali; and, lastly, dry it."

Sulphuric acid scarcely acts on mercury unless aided by a high temperature. When it is boiled on it, as directed in these processes, the acid is partially decomposed by the metal which is oxidized, while sulphurous gas is evolved; and the oxide thus formed uniting with the remaining acid, the whole becomes a supersulphate of mercury. By continuing the application of heat, at a higher temperature, a considerable portion of the acid is expelled, and partly decomposed, by which the metal is still more highly oxidized, and the resulting dry mass is a subsulphate of mercury. When boiling water is poured on this salt, the fluid, acting by its powerful affinity for sulphuric acid, decomposes it, abstracts the acid, and precipitates the oxide; but as the acid still holds combined with it a small portion of oxide, and the precipitated oxide retains some acid, the result of this part of the process is a supersulphate of mercury held in solution by the water, and a sub-sulphate precipitated in the form of a yellow powder. To obtain this effect completely, the saline mass must be made entirely dry before pouring over it the hot water; for if the vessel be sooner taken from the fire, the precipitation is partial only, the greater part of the salt being dissolved without being decomposed. Perhaps the best mode is to continue the exsiccation until a little of the white mass dissolved in cold water does not redden litmus paper. The proportions for obtaining the largest quantity of product are two parts of acid, and one of mercury: hence, while the quantity ordered by the Dublin College is rather too small, the proportions of the Edinburgh formula are productive of a very unnecessary waste of acid.

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[1] *Hydrargyrus vitriolatus*, P. L. 1787. Subsulphate de Mercure (*F.*) Gelbes Schwefelsaures Quecksilberoxyd (*G.*) Turpeto Minerale Mercuriale (*I.*)

Qualities. — Subsulphate of mercury is inodorous, and acrid to the taste. It is obtained in the form of a beautiful bright yellow powder, of a specific gravity of 6·444, and nearly insoluble in water, requiring 2000 parts at 60°, and 600 at 212°, for its solution, which is colourless. By trituration with mercury it is changed into the black oxide; and at a red heat is decomposed, the oxygen being given out and the metal reduced. According to the analysis of Braumcamp and Segueira, its constituents are 84·7 parts of oxide of mercury, 15 of sulphuric acid, and three of water[1]; while Fourcroy makes them 87 of oxide, 10 of acid, and three of water.

Medical properties and uses.—This preparation is emetic, discutient, alterative, and errhine; but from the violence of its action it is seldom administered as an internal remedy. As an errhine, however, it has been found extremely useful in chronic ophthalmia, and diseases of the head; but even for this purpose its acrimony requires to be sheathed with some bland powder, as starch, or liquorice root powder, in the proportion of grs. v. to gr. j. of the subsulphate. In doses of gr. v. it operates as a very powerful emetic.

HYDRAR'GYRUM CUM CRETA. Lond. *Mercury with Chalk.*[2]

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[1] *Annales de Chimie,* liv. 123.

[2] Mercurius alkalizatus, P. L. 1745.

"Take of purified mercury, *three ounces*; prepared chalk, *five ounces*. Rub them together until the globules disappear."

HYDRARGYRUM CUM CRETA. Dub. *Mercury with Chalk.*

"It is prepared in the same manner as the mercury with magnesia, only instead of magnesia employing precipitated chalk."

In these processes the mercury is slightly oxidized during the trituration, and is in the state of the black oxide, 100 parts of which, according to Fourcroy, contain, when well prepared, about 4 of oxygen.

Medical properties and uses. — It is alterative, and is occasionally prescribed in tinea capitis, and other cutaneous affections; but it merits attention as a mild alterative for children. The dose may be from grs. v. to ʒſs. given twice a day, mixed in any viscid substance.

HYDRARGYRUM CUM MAGNESIA. Dub. *Mercury with Magnesia.*

"Take of mercury, manna, of each *an ounce*; magnesia, *half an ounce*. Triturate the mercury with the manna in an earthen mortar, adding as many drops of water as will give to the mixture the thickness of syrup, and continue the rubbing until the metallic globules completely disappear; then add, still triturating, *a drachm* of magnesia; and after the whole is well mixed together, add *a pint* of hot water, and agitate the mixture. Allow the mixture to remain for some time at rest, in order that the sediment may subside, from which the fluid is to be decanted. Repeat the washing a second and a third time, that the whole of the manna may be removed; and add the remainder of the magnesia to the sediment while it is still moist. Finally, dry the powder upon bibulous paper."

The addition of the manna in this process, and in the former preparation with chalk of the Dublin College, is intended only to facilitate the oxidizement of the mercury; and therefore it is afterwards removed by the subsequent washings, so that the product remains a grey or black oxide of mercury, mixed with magnesia. It is a preparation which might well be rejected.

HYDRAR'GYRUM PRÆCIPITATUM[1] AL'BUM. Lond. *White Precipitated Mercury.*[2]

"Take of oxymuriate of mercury, *half a pound*; muriate of ammonia, *four ounces*; solution of subcarbonate of potash, *half a pint*; distilled water, *four pints*. Dissolve first the muriate of ammonia, then the oxymuriate of mercury, in the distilled water, and add to the mixed solution the solution of subcarbonate of potash. Wash the precipitated powder until it become tasteless, and then dry it."

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[1] This name is completely at variance with the principles on which the reformed nomenclature is founded; and the reasons which might have excused the adoption of *calomel*, and some other equally barbarous terms, cannot be advanced in justification in this instance.

[2] Mercurius præcipitatus albus, P.L. 1745. Calx hydrargyri alba, P.L. 1787. Muriate de mercure precipitè (*F.*) Salzsaures Quecksilber präzipitat (*G.*) Precipitato bianco di mercurio (*I.*)

SUBMURIAS HYDRARGYRI AMMONIATUM. Dub. *Ammoniated Submuriate of Mercury.*

"Add to the fluid which has been poured off from the precipitated submuriate of mercury a quantity of water of caustic ammonia sufficient to precipitate the whole of the metallic salt. Wash the precipitate with cold distilled water, and dry it upon bibulous paper."

As the products of these two processes are precisely the same, that of the Dublin College is to be preferred, both on account of its œconomy, and its greater simplicity. The fluid it orders to be used, is that which is decanted from the precipitated mild muriate of mercury, prepared by heat; and which, as we have already observed, holds the corrosive muriate in solution; so that the oxide of this salt is precipitated by the ammonia, combined with a portion of acid and also of ammonia, forming a ternary compound, or a submuriate of mercury and ammonia. In the London process, the muriate of ammonia, and the oxymuriate of mercury, when dissolved in the water, combine together, and form a solution of a ternary compound of muriatic acid, ammonia, and oxide of mercury, or a soluble supermuriate of mercury and ammonia. By the addition of the subcarbonate of potash, a great part of the acid, both of the muriate of ammonia, and of the mercurial salt, is abstracted, and the same triple insoluble compound is precipitated as in the former process; and the fluid retains in solution muriate of potash, the carbonic acid having been dissipated in the gaseous form. It is to be regretted, that the quantity ordered is inadequate to the effect intended.

Qualities.—This muriate of mercury and ammonia is inodorous and insipid; of a snowy whiteness, smooth, and insoluble in water, and does not become black when triturated with lime water. It is decomposed by the sulphuric and nitric acids, the former of which converts it into oxymuriate of mercury and sulphate of mercury and ammonia, and the latter into the oxymuriate also, and nitrate of ammonia and mercury. Muriatic acid restores it to the state of soluble supermuriate, the *sal alemroth* of the old chemists. According to Fourcroy's analysis, its constituents are, 81 parts of oxide of mercury, 16 of muriatic acid, and 3 of ammonia. It is sometimes adulterated with white lead; to discover which, digest one part of it in four parts of acetic acid, and add to the solution a small quantity of sulphuret of ammonia; a black precipitate insoluble in sulphuric acid indicates the presence of lead. Chalk and starch are also sometimes mixed with it; and may be detected by heating the preparation in an iron spoon: if pure, it is completely volatilized; but if adulterated with starch, a black coal is left; or, if with chalk, a white powder, at the bottom of the spoon.

Medical properties and uses. — This preparation is only used, in combination with lard, as an ointment for the cure of itch, and some other cutaneous eruptions.

Officinal preparation. *Unguentum Hydrargyri præcipitati albi.* L. D.

HYDRARGYRUM PURIFICATUM. Lond. *Purified Mercury.*[1]

"Take of mercury, *six pounds;* filings of iron, *a pound.* Rub them together, and distil the mercury from an iron retort."

HYDRARGYRUS PURIFICATUS. *Purified Mercury.*

Edinburgh.

"Take of mercury, *six parts;* filings of iron, *one part.* Rub them together, and distil from an iron retort."

HYDRARGYRUM PURIFICATUM. Dub. *Purified Mercury.*

"Take of mercury, *six pounds.* Distil off slowly four pounds."

By this mode of treating mercury it is certainly obtained more bright and mobile; but although it is generally supposed that the iron operates by exerting a superior affinity for the foreign metals with which the mercury of commerce is supposed to be alloyed, yet this is altogether hypothetical, and the necessity of the process may be well questioned.

LIQUOR HYDRARGYRI OXYMURIATIS. Lond. *Solution of Oxymuriate of Mercury.*

"Take of oxymuriate of mercury, *eight grains;* distilled water, *fifteen fluid ounces;* rectified spirit, *a fluid ounce.* Dissolve the oxymuriate of mercury in the water, and add to it the spirit."

This solution is intended to facilitate the administration of minute doses of oxymuriate of mercury, each fluid ounce of the solution containing half a grain of the salt. It ought not to be long kept or exposed to a clear light, as the oxymuriate is gradually decomposed, and calomel precipitated. It is, however, the most safe and convenient form of administering this active salt; and may be given as an antisyphilitic in doses of from fʒſs. to fʒij. in f℥ij. of linseed infusion, or water and syrup, and in more minute doses when its alterative effects only are required. As a local application, this solution, diluted with two parts of water forms a useful gargle in venereal sore throat; and without dilution we have found it serviceable as a gargle for breaking the abscess in cynanche tonsillaris, when suppuration takes place. Diluted with an equal quantity of water, it is employed as a wash against tetters and scabies; and very largely diluted, it may be used as an injection in gonorrhœa: or given in the form of enema, when the stomach will not receive it.

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[1] Argentum vivum purificatum, P. L. 1745. Mercure (*F.*) Quecksilber (*G.*) Mercurio (*I.*) Azogogue (*S.*)

In concluding the account of the preparations of mercury, it may not be improper to observe that the exhibition of any of them in certain states of the habit, and at the time under exposure to cold, is apt to excite an erythematic eruption of the skin, accompanied with much fever. This disease does not at all depend on the use of any particular preparation of the remedy; but, as far as I have been able to observe, it is liable to show itself in such an irritable state of the habit as produces hysteria in females, when the body is very suddenly exposed to a current of cold air, or to a cold moist atmosphere, while under the influence of mercury. When it occurs, the mercurials must be immediately discontinued, bark, opium, and purgatives internally administered, and the affected surface sprinkled with dry flour, or covered with the *linimentum aquæ calcis* of the Edinburgh and Dublin pharmacopœias; while at the same time the warm bath is to be used at least twice a day. Under this treatment the disease generally disappears, and the use of the mercurial may be renewed; but sometimes the morbid symptoms increase under every mode of treatment, and a fatal termination of the disease ensues.

PRÆPARATA E STANNO.

PREPARATIONS OF TIN.

PULVIS STANNI. Dub.[1] *Powder of Tin.*

"Take of tin, *any quantity.* Melt it over the fire in an iron mortar, and stir it while it is cooling, until it becomes a powder, which, when cold, is to be passed through a sieve."

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[1] Poudre d' Etain (*F.*) Zinn (*G.*) Stagno in polvere (*I.*)

By this process tin is reduced to the form of a fine granular powder, and, perhaps, by the constant stirring, it is also very slightly oxidized, for the powder has less brilliancy than the entire metal.

Medical properties and uses. — Powder of tin is a mechanical anthelmintic. It has been chiefly given in tænia; and is supposed to operate by the grittiness of its particles irritating the worm, and dislodging it from the mucus in which it is imbeded. It is given in doses of ʒj. or ʒij. mixed in treacle, for two or three successive mornings, and a brisk cathartic afterwards exhibited. But it is likely to be, henceforth, seldom used, oil of turpentine being a much superior remedy for the expulsion of tænia.

PRÆPARATA E PLUMBO.

Preparations of Lead.

LI'QUOR PLUM'BI SUBACETA'TIS. Lond. *Solution of Subacetate of Lead.*[1]

"Take of semi-vitrified oxide of lead, *two pounds*; acetic acid (distilled vinegar), *a gallon*. Mix them, and boil down to six pints, assiduously stirring; then set the solution aside, that the impurities may subside, and strain it."

Liquor Subacetatis Lithargyri. *Dub.* *Solution of Subacetate of Lead.*

"Take of litharge, *a pound*; distilled vinegar, *eight pints.* Put them into a glass vessel, and boil to six pints, assiduously stirring; then set the solution aside, and strain it after the fæces have subsided."

In these processes, the acetic acid, which the distilled vinegar contains in a highly diluted state, attracts a portion of the oxide of lead, and forms an acetate, which remains dissolved in the water. The two Colleges err in naming it a subacetate. The proportion of litharge ordered in both formulæ is too large, a gallon of distilled vinegar of the specific gravity 1·007 being capable of dissolving ten ounces only of the oxide.

Qualities. — This solution of acetate of lead, when properly prepared with pure distilled vinegar, is of a greenish straw-colour, has a slight acetous odour, and an austere somewhat sweetish taste. It is partially decomposed when largely diluted with distilled water; and with pump water, a heavy precipitate instantly takes place: it is also precipitated in the form of a white sub-salt by the alkalies and their carbonates; and a black precipitate is produced by the alkaline sulphurets. This solution is also incompatible with solutions of mucilage, the gum of which it coagulates; and, indeed, it is the most delicate test for mucilage with which we are acquainted. According to the experiments of Dr. Bostock [1], the constituents of 100 parts of the saturated solution are 23·1 of oxide of lead, 5 of acetic acid, and 71·9 of water, which agree with the statement of Thenard[2], who found that the salt, when crystallized, consists of 17 parts of acid, 78 of oxide of lead, and 5 of water, in 100 parts.[3]

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[1] Aqua lithargyri acetati, P. L. 1787. Acetate de Plomb liquide (*F.*) Blaiwasser (*G.*) Aceto di Saturno (*I.*)

Medical properties and uses. — This solution is used only externally, and when diluted with water forms a very useful cooling, discutient application to phlegmonous inflammations and burns. It was introduced into practice by M. Goulard, a surgeon of Montpelier; and hence was long distinguished by the appellation of Goulard's Extract.

LI'QUOR PLUM'BI SUBACETA'TIS DILU'TUS. Lond. *Diluted Solution of Subacetate of Lead.*[4]

"Take solution of subacetate of lead, *a fluid drachm;* distilled water, *a pint;* proof spirit, *a fluid drachm.* Mix."

LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. Dub. *Compound Solution of Subacetate of Litharge.*

The same as the London formula, with double the quantity of each of the ingredients.

This preparation, as an article in the pharmacopœia, is superfluous, every surgeon being in the habit of ordering lotions with different proportions of the solution of acetate of lead, according to the circumstances of the case.

PLUM'BI SUPERACE'TAS. Lond. *Superacetate of Lead.*[5]

"Take of carbonate of lead, *a pound;* acetic acid (distilled vinegar), *a gallon and a half.* Boil the carbonate of lead with the acid until this is saturated; then filter the solution through paper, and, having evaporated it until a pellicle appears on its surface, set it apart that crystals may form. Pour off the fluid, and dry the crystals upon bibulous paper."

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[1] *Nicholson's Journal,* xi. 75.

[2] Ibid. vi. 223.

[3] The nature of the salt in this solution was first pointed out by Scheele, who changed a solution of the superacetate of lead into Goulard's extract, by keeping it in a plate of lead for the space of a day; but this experiment was over-looked until Dr. Bostock's analysis of the preparation. An excellent mode of preparing it is employed in the French Hospitals. Three parts of superacetate of lead is dissolved in a sufficient quantity of hot distilled water, and to the solution one part of semi-vitreous oxide of lead is added, in fine powder. The whole is then evaporated until it marks 28° of Beaumè's areometer; and when cold filtered. Vide *Journ. de Pharm. Dec.* 1876. p. 565.

[4] Aqua lithargyri acetati composita, P. L. 1787.

[5] Saccharum saturni, P. L. 1720—45. Cerussa acetata, P. L. 1787. Acetate de Plomb cristallisé (*F.*) Essigsaures Blei (*G.*) Zucchero di Saturno (*I.*)

ACETAS PLUMBI. Edin. *Acetate of Lead.*

"Take of white oxide of lead, *any quantity;* weaker acetic acid, *a sufficient quantity.* Put the oxide into a cucurbit, and pour over it ten times its weight of the acid. Let the mixture stand upon a warm sand-bath until the acid becomes sweet; then let this be poured off, and add fresh portions of acid successively, until no more sweetness is communicated. Evaporate all the fluid, freed from impurities, in a glass vessel to the consistence of thin honey, and set it aside in a cold place that crystals may form, which are to be dried in the shade. Evaporate again the residuary liquor, that new crystals may be obtained; and repeat the evaporation until no more are formed."

ACETAS PLUMBI. Dub. *Acetate of Lead.*

"Take of subacetate of lead, called CERUSSA, *any quantity,* distilled vinegar, *ten times its weight.* Digest them in a glass vessel until the vinegar becomes sweet; and having poured this off, add more, until it ceases to become sweet. Filter the solution, and crystallize by alternate slow evaporation and cooling. Dry the crystals in the shade."

In these processes the acetic acid of the distilled vinegar unites with the oxide of lead of the carbonate; and by the subsequent evaporations the salt crystallizes in the form of an acetate. But on account of the smallness of the quantity of product, the trouble and expence of the process, and the difficulty of obtaining the white lead perfectly free from whitening (carbonate of lime), with which it is generally adulterated, the preparation of this salt is seldom undertaken by the apothecary; so that the superacetate usually found in the shops is the salt which is manufactured on a large scale, for the use of the calico-printers, purified. It is chiefly prepared in Holland, in the following manner: Sheets of lead, coiled up, are put into pots, in which they are half immersed in distilled vinegar, and digested a sufficient time. Before long the upper half, or that which is not immersed, is covered with an efflorescence of cerusse, after which it is immersed in the vinegar, and the part which was before immersed is now brought up to be converted into cerusse as before, when the plate is again turned; and this is repeated two or three times a day, until the vinegar becomes milky. This solution is next boiled in tinned vessels down to about one-third of the original quantity, then strained, and the salt crystallized by slow cooling. The crystals obtained by a second evaporation of the mother-water are browner, and deliquescent[1]: and as these are generally mixed with the others, the whole requires to be again dissolved in rain or distilled water, and re-crystallized, before they are fit for medicinal purposes.

Qualities.—This salt, when pure, is inodorous, has a sweet, astringent taste, and crystallizes in white glossy, acicular, flat, four-sided prisms, terminated by dihedral summits, which are generally aggregated into irregular masses that have the appearance of lumps of sugar. Its specific gravity is 2·35.[2] Acetate of lead slightly effloresces, is soluble in 25 parts of distilled water either hot or cold; but after standing for some time a slight decomposition takes place, and a small portion of white powder is deposited, which is an insoluble carbonate. It is also soluble in alcohol. In pump or hard water it is instantly decomposed, forming a milky solution, and a copious precipitate falls. It is decomposed by the alkalies and their carbonates, most of the acids, and neutral salts, lime, and magnesia; but it does not affect a solution of gum. According to the analysis of Thenard, the constituents of 100 parts are 58 of oxide of lead, 26 of acid, and 16 of water.[3]

Medical properties and uses.—Taken internally, superacetate of lead is a very powerful astringent, and sedative. It requires to be exhibited, however, with caution, and is admissible only in cases of very urgent danger, as in violent pulmonary and intestinal hæmorrhages, in restraining which it has a very powerful influence. Combining it with opium prevents the deleterious effects which salts of lead are apt to produce when taken into the stomach; but, even when so combined, the smallest dose, in certain habits, is productive of very serious mischief. Some years ago, Dr. Hildebrand of Lemberg tried this salt in combination with opium with seeming advantage in phthisis; and it has been since occasionally used in this country; but from the effects of it in that disease, as far as I have observed, it is not likely to be generally employed by British practitioners. Dissolved in a large proportion of water, it forms an excellent collyrium in ophthalmia; and somewhat less diluted, its solution is in common use as an external application in superficial inflammation. Objections have, nevertheless, been raised to the long-continued external use of the preparations of lead; but the daily extensive employment of them in this form, without any bad effects, is a sufficient proof that, if they occasionally have produced mischief, it is rather to be attributed to some peculiar idiosyncracy, than to the nature of the remedy.

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[1] *Aikin's Dictionary of Chemistry*, ii. 26.

[2] Hassenfratz.

[3] *Nicholson's Journal*, vi. 228.

The dose of superacetate of lead, when internally exhibited, should not exceed gr. ſs. given every six or eight hours. It may be made into a pill with crumb of bread, and a proportion of opium, according to the circumstances of the case. As a collyrium or lotion, the proportions may be from gr. x. to ℈j. of the salt in f℥viij of distilled water. The addition of a small quantity of distilled vinegar is necessary to prevent decomposition, when distilled water is not employed.

Officinal preparation. *Ceratum Plumbi Superacetatis*. L. E. D.

PRÆPARATA E ZINCO.

PREPARATIONS OF ZINC.

CALAMINA PRÆPARATA. Lond.[1] *Prepared Calamine.*

" Burn the calamine, and beat it to powder; then bring it into the state of a very fine powder, in the manner directed for the preparation of chalk."

CARBONAS ZINCI IMPURUS PRÆPARATUS. E. *Prepared impure Carbonate of Zinc.*

" Impure carbonate of zinc, roasted by those who make brass, being rubbed to powder in an iron mortar, and levigated with a little water in a porphyry, is to be put into a large vessel, and water poured over it, which after frequently agitating the vessel, is to be poured off loaded with the powder. The fine powder which subsides after the water has remained at rest, is then to be dried. The coarse, which the water cannot suspend, is to be again levigated, and treated as before."

LAPIS CALAMINARIS PRÆPARATUS. Dub. *Prepared Calamine Stone.*

" Reduce calcined calamine stone to powder, and separate the very fine parts in manner directed for the preparation of chalk."

The nature of this ore of zinc has been already stated. (*Part* ii.) As it is frequently used in the form of a dry powder to excoriations, ichorous ulcers, and superficial inflammations, dusted on the part, it requires to be rendered extremely fine.

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[1] Calamine preparé (*F.*) Galmei (*G.*) Calamina (*I.*)

Officinal preparations. *Ceratum Calaminæ.* L.E. *Unguentum Calaminaris.* D.

OXIDUM ZINCI IMPURUM PRÆPARATUM. Edin. *Prepared impure Oxide of Zinc.*

"It is prepared in the same manner as the impure carbonate of zinc."

This substance, the nature of which has been already stated, (*Part* ii.) is used for the same purposes as the former article.

ZINCI OXYDUM. Lond. *Oxide of Zinc.*[1]

"Throw, gradually, small pieces of zinc into a large deep crucible, heated to whiteness, and inclined to one side, with another crucible placed over it in such a manner that the zinc may be exposed to the action of the air, and frequently stirred with an iron rod. Remove, from time to time, the oxide as it forms, and pass the white and lighter part of it through a sieve. Lastly, pour water upon this, so that an impalpable powder may be formed in the same manner as ordered for the preparation of chalk."

OXIDUM ZINCI. Edin. *Oxide of Zinc.*

"Let a large crucible be placed in a furnace filled with burning coals, in such a manner as to be somewhat inclined to its mouth, and when the bottom of it is heated to a moderate degree of redness, throw into it a piece of zinc about the weight of one drachm. The zinc is soon inflamed, and converted into white flocculi, which are occasionally to be removed from the surface of the metal by means of an iron spatula, that the combustion may be more complete; and when the inflammation is over, remove the oxide of zinc from the crucible. Throw in then another piece, and let the operation be repeated as often as is necessary. Finally, let the oxide of zinc be prepared in the same manner as the impure carbonate of zinc."

Dublin.

"Take of zinc broken into small pieces, *any quantity.* Throw these, at intervals, into a sufficiently large crucible heated to whiteness, and placed with its mouth inclined towards the mouth of the furnace. After each piece of zinc is thrown in, invert over the crucible another crucible, but loosely so as not to exclude the air. Preserve the light, very white, sublimed powder for use."

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[1] The ancients, who were acquainted with it, called it pompholyx; and by the early chemists it was named *Nihil album, Luna philosophica,* and *Flores zinci.* Zincum calcinatum, P. L. 1787. Oxide de Zinc (*F.*) Weisser Zinkoxyd (*G.*) Per Ossido di Zinco; fiori di Zinco (*I.*)

In these processes, the crucible must be heated above 700° of Fahrenheit, which is the point of ignition of zinc. At this temperature the metal inflames, burning with a dazzling white and green flame; and by attracting the oxygen of the air is converted into a white oxide, which is partly volatilized in the form of very light flocculi. The elevation of these flocculi, however, is owing to the current of air excited by the force of the combustion; for the oxide itself is not volatile, but accumulates in the crucible so rapidly, that it must be withdrawn to allow the access of the air for keeping up the combustion. If the crucible be sufficiently capacious, there is no necessity for covering it with another, by which the operation is always impeded. The subsequent levigation is intended to remove any particles of metallic zinc, which are generally involved in the oxide.[1]

Qualities. — Oxide of zinc thus prepared is inodorous, insipid, of a pure white colour, infusible in the fire, insoluble in water and alcohol, but entirely soluble in acids, and is not altered by exposure to the air. According to Proust, 100 parts of it consist of 80 of zinc, and 20 of oxygen; or 100 zinc + 25 oxygen. It often contains small portions of carbonic acid.[2] It is often adulterated with chalk, and sometimes contains white lead. By pouring sulphuric acid on the specimen, the first is discovered by the effervescence that is excited, the second by an insoluble sulphate of lead being formed.

Medical properties and uses. — Oxide of zinc is tonic and antispasmodic; and has been advantageously used in chorea, epilepsy[3], and some other spasmodic affections. It has been employed in hooping-cough on the continent; and Lœffler recommends it to be used externally as well as internally in that disease. He employs a liniment composed of linseed oil, and oxide of zinc. It is chiefly used as an external application. (See *Ung. Zinci.*)

The dose, as an internal remedy, may be from gr.j. to grs. vj. given twice a day.

Officinal preparation. *Unguentum Zinci.* L. E. D.

ZINCI SULPHAS.[4] Lond. *Sulphate of Zinc.*

"Take of zinc broken into small pieces, *three ounces;* sulphuric acid, *five ounces ;* water, *four pints.* Mix them in a glass vessel, and the effervescence being over, filter the solution through paper; then boil it until a pellicle begins to form on the surface, and set it aside to crystallize."

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[1] This oxide may also be readily prepared by dissolving zinc in diluted sulphuric or nitric acid, and precipitating by potash, a process proposed by Marabelli, Professor of Pharmacy at Pavia, in 1798. The washed precipitate is oxide of zinc, containing, according to Vauquelin, 0·21 of oxygen.

[2] *Annales de Chimie*, xxxv. 51. The more recent experiments of Dr. Thomson make the proportions to be metal 100 + 24·16 oxygen; those of Berzelius, metal 100 + 24·4 oxygen.

[3] *Duncan's Med. Comment.* iii. 216.

[4] Zincum vitriolatum, P.L. 1787. Sulphate de Zinc (*F.*) Schwefelsaurer Zink (*G.*) Solfato di Zinco (*I.*) Vitriolo bianco (*S.*)

Edinburgh.

"Take of zinc cut into small pieces, *three parts ;* sulphuric acid, *five parts* ; water, *twenty parts.* Mix them, and the effervescence being finished, digest for a short time on hot sand. Then filter the decanted solution through paper, and after due evaporation, set it apart that crystals may be formed."

Dublin.

"Take of zinc reduced to powder in the same manner as tin, *three ounces ;* sulphuric acid, *five ounces* : water, *a pint.* Pour the acid previously diluted with the water upon the zinc, put into a glass vessel; digest for a short time after the effervescence ceases; then evaporate to a proper point the strained solution, and set it aside to crystallize."

The directions of the Dublin College for granulating the zinc are to be adopted in preference to those of the other Colleges for dividing it. In these processes, the acid enables the zinc to decompose the water, and the metal is oxidized by attracting its oxygen, while its hydrogen is disengaged with effervescence. The oxide thus formed combines with the acid, forming sulphate of zinc, which is obtained in crystals by the subsequent evaporation. The greater part, however, of the sulphate of zinc of the shops is prepared on a large scale, and purified in the manner that shall be immediately noticed. It is denominated *white vitriol* in the language of commerce, and is manufactured largely both in Germany[1] and England. In Germany it is prepared by exposing roasted blende to the air and humidity; by which means the metal is gradually oxidized, and combined with the sulphuric acid also formed from the sulphur contained in the blende. The sulphate thus produced is separated from the earthy parts of the blende by lixiviation, and after being boiled down is crystallized, or rather concreted, into hard granular masses resembling loaf sugar, which generally contain sulphate of iron, of lead, and sometimes of copper. In England it is prepared generally by the direct combination of its constituents; but although purer than the foreign salt, yet the English white vitriol, almost always, contains iron. Both kinds are purified by solution in water, and then allowing the solution to evaporate very slowly in an open vessel containing some granulated zinc; the sulphate of lead will subside, and the other foreign salts be decomposed by the metallic zinc. The purified sulphate of zinc may be then crystallized by lixiviation and evaporation.[1]

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[1] Beckman, in his History of Inventions, says, it was first made at Ramelsberg, in Germany, about the middle of the 16th century; and ascribes the invention to Julius, duke of Brunswick.

Qualities.—Pure sulphate of zinc, or rather *supersulphate*, for it contains an excess of acid and reddens the vegetable blues, is inodorous, and has a slightly acidulous, styptic, metallic taste. It crystallizes in transparent, colourless, flattish, tetrahedral prisms, terminated by quadrangular pyramids; effloresces slightly in the air; is soluble in 2·5 times its weight of water at 60°, and in less than its own weight of boiling water. It is decomposed by the alkalies, earth, and hydrosulphurets; and throws down a dirty-looking precipitate from astringent vegetable infusion, with which, therefore, it is incompatible in prescriptions. According to the analysis of Dr. Wollaston, the constituents of 100 parts of the pure crystallized salt are 28·4 of oxide of zinc, 27·3 of acid, and 44·3 of water.

Medical properties and uses. — Sulphate of zinc is tonic and astringent, and in large doses emetic. As a tonic, it is less heating and stimulant than sulphate of iron, and hence is preferable in phthisis and other diseases attended with great irritability and general weakness. It is also useful in dyspepsia, fluor albus, and some convulsive affections, as pertussis, chorea, and epilepsy; in which diseases it is generally combined with myrrh, bitter extracts, opium, extract of hemlock, or digitalis, according to the circumstances of the case. As an emetic it operates almost instantaneously, and therefore is often employed to empty the stomach at the commencement of the paroxysm of intermittent fever, and in other cases in which quick vomiting is required. As an external application this salt dissolved in rose-water, in the proportion of grs. iſs. to f℥j. of rose-water, forms an excellent collyrium in the latter stage of ophthalmia, after the inflammatory action has subsided; it is a good injection in a similar stage of gonorrhœa; and a lotion in some kinds of superficial inflammations. In double the strength, this solution is the best application that can be used to scrophulous tumours, after they have suppurated, and the abscess has been discharged.

The dose to produce vomiting is from grs. x. to ʒſs. and as a tonic from gr. j. to grs. ij. may be given twice a day.

Officinal preparations. *Solutio Sulphatis Zinci.* E. *Liquor Aluminis compositus.* L. *Solutio Acetatis Zinci.* E. D.

SOLUTIO SULPHATIS ZINCI. Edin. *Solution of Sulphate of Zinc.*

" Take of sulphate of zinc, *sixteen grains*; water, *eight ounces*; diluted sulphuric acid, *sixteen drops*. Dissolve the sulphate of zinc in the water, and having added the acid, filter the solution through paper."

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[1] *Aikin's Dictionary of Chemistry.*

This formula is given under the idea of the common sulphate of zinc, (which often contains some excess of oxide, and some oxide of iron,) being employed. The superabundant oxide, if present, is dissolved by the acid, so that a solution of an uniform strength is always obtained. It is rather too strong for the purposes of a collyrium in chronic ophthalmia; and the addition of the acid renders it less fit to be used as an injection in gonorrhœa.

SOLUTIO ACETATIS ZINCI. Edin.[1] *Solution of Acetate of Zinc.*

"Take of sulphate of zinc, *one drachm*; acetate (*superacetate*) of lead, *four scruples*; distilled water, *twenty ounces*. Dissolve. Mix the salts separately in ten ounces of the water; then mix the solutions, and after the precipitate subsides, filter."

In this process a double decomposition takes place: the sulphuric acid of the sulphate of zinc, unites with the oxide of lead of the superacetate of lead, whilst its acid combines with the disengaged oxide of zinc. The former salt being insoluble, is precipitated in the form of a heavy white powder, but the acetate of zinc remains dissolved; and thus its solution, which is colourless and limpid, is easily separated by filtration.

Medical properties and uses.—This solution is astringent; and was long employed before it was introduced into the pharmacopœia, and even before its nature was clearly understood. It is an useful collyrium in chronic ophthalmia, and in the acute variety of this disease after the inflamed vessels are unloaded, and the inflammatory action subdued. It is also an useful injection in the advanced state of gonorrhœa.

TINCTURA ACETATIS ZINCI. Dub. *Tincture of Acetate of Zinc.*

"Take of sulphate of zinc, acetate of kali, of each, *an ounce*. Rub them together, and add of rectified spirit of wine, *one pint*. Macerate for a week with occasional agitation, and filter through paper."

In this process, a double decomposition also takes place, acetate of zinc, and sulphate of potash being produced; the former of which is dissolved in the spirit, while the latter remains undissolved, and therefore is easily separated. It is a tedious process, and possesses no advantages over the former to recommend it.

Medical properties and uses.—This tincture is astringent; but requires to be diluted with water, before it can be used either as a collyrium or injection. It might be advantageously employed as an internal remedy in dyspepsia, and other debilities of the stomach.

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[1] Dissolution d'Acetate de Zinc (*F.*) Liquore de l'Acetato di Zinco (*I.*)

PREPARATIONS OF SULPHUR.

Pure Sulphur, according to Sir H. Davy's experiments, is a triple compound of oxygen, hydrogen, and a peculiar unknown base. It unites readily with metals, some oxides, earths, and the fixed alkalies, forming compounds which have been denominated *sulphurets*. These are formed by the fusion of the substances in a dry state; and the compounds require to be carefully preserved from the atmosphere, as they attract moisture from it, deliquesce, and are decomposed. When, however, the union of sulphur and alkaline or earthy bases is effected by means of water, the products are not simple *sulphurets*, but sulphurets combined with sulphuretted hydrogen, and have been named *hydrogureted sulphiurets*. They are equally susceptible of decomposition by exposure to the air as the sulphurets.

OLEUM SULPHURA'TUM.[1] Lond. *Sulphurated Oil.*

"Take of washed sulphur, *two ounces;* olive oil, *a pint*. Add the sulphur gradually to the oil heated in a very large iron pot, and stir the mixture after each addition till they have united."

Edinburgh.

"Take of olive oil, *eight parts;* sublimed sulphur, *one part*. Boil them with a gentle heat in a large iron vessel, stirring constantly, until they unite."

Great attention is required in these processes to prevent the mixture from boiling over, or its vapour from catching fire. If either of these accidents occur, the combustion may be stopped by instantly covering the pot with a close lid. The iron pot should be sufficient to contain thrice the bulk of the ingredients.

Qualities. — The odour of this solution of sulphur is extremely fœtid, and the taste acrid. It is of a reddish brown colour; has a thick consistence; and when heated emits sulphureted hydrogen. When it is much concentrated, the sulphur crystallizes in octohedrons.

Medical properties and uses. — Sulphureted oil is stimulant, and externally detergent. It was formerly regarded as balsamic, and recommended in catarrh, asthma, and phthisical affections; but its internal use is now properly exploded. It is sometimes still externally applied for cleansing foul ulcers. The dose was from ♏ v. to ♏ xxx. taken in water.

POTA'SSÆ SULPHURE'TUM. Lond. *Sulphuret of Potash.*[2]

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[1] Balsamum Sulphuris simplex, P. L. 1745. Huile sulphur (*F.*) Oleo sulfurato (*I.*)

[2] Kali Sulphuratum, P. L. 1787. Sulphure de Potasse (*F.*) Schwelflichtes Kali (*G.*) Solfuro di Potassa (*I.*)

"Take of washed sulphur, *an ounce*; subcarbonate of potash, *two ounces*. Rub them together, and place the mixture over the fire in a covered crucible until they unite."

SULPHURETUM POTASSÆ. Edin.

"Take of subcarbonate of potash, *two parts*; sublimed sulphur, *one part*. Rub them together, and put them into a large covered crucible, to which, having adapted a cover, apply the fire cautiously, until they melt. Preserve the mass in a well-closed vessel."

SULPHURETUM KALI. Dub. *Sulphuret of Kali.*

"Take of subcarbonate of kali, sublimed sulphur, each *two ounces*. Having mixed them together, put them into a crucible, and having adapted to it a cover, expose it to a fire gradually raised until they unite."

This sulphuret cannot be properly formed by following the directions of any of the Colleges; for, to render the combination complete, it is necessary to expose the subcarbonate in a crucible to a red heat, previously to its being rubbed with the sulphur: the water of the subcarbonate is thus dissipated, and at the same time a portion of the carbonic acid is expelled, both of which, when not driven off, alter the product. When the fusion is effected, the mixture is to be poured upon a marble slab, and, as soon as it concretes, the mass must be broken in pieces and preserved in a closely-stopped bottle.

Qualities.—Well prepared sulphuret of potash is inodorous while dry; but when moistened or dissolved in water, a partial decomposition of both the water and the sulphuret is effected, and it emits the fœtid odour of sulphuretted hydrogen. It has an acrid bitter taste; changes the vegetable blues to green; is hard, brittle, breaking with a glassy fracture, of a liver-brown colour, and stains the skin brown.[1] By exposure to the air it attracts moisture; its colour changes to a pale green, the fœtid odour noticed above is emitted, and it is gradually converted into hydroguretted sulphuret of potash, combined with a small portion of sulphate of potash. It is also decomposed by all the acids, the sulphur being precipitated; and in a violent heat the sulphur sublimes, leaving the potash.

Medical properties and uses.—Sulphuret of potash is expectorant and diaphoretic. It has been frequently given in chronic asthma and chronic catarrh, without much benefit; but has been found useful in arthritic, rheumatic, and herpetic affections; and in combination with cicuta as a palliative in cancerous cases.[2] It has also been employed in France, for the cure of scabies, in the form of an ointment made with one part of the sulphuret, 16 of soap, and 32 of oil. From a theory founded on its chemical action on metallic salts out of the body, it has, also, been strongly recommended as an antidote against arsenical, saturnine, and mercurial preparations, when these have been taken in doses sufficient to produce deleterious effects; but it has hitherto been too seldom employed to ascertain its real value in these cases.

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[1] Hence its old name, *Hepar Sulphuris.*

[2] *Pearson's Practical Synopsis, &c.* i. 283.

The usual dose is grs. iij. or grs. iv. combined with soap, in the form of pills, for the first-mentioned cases; or from grs. v. to grs. x. as an adjunct to cicuta in cancer, given several times a day.

SUL'PHUR LOTUM. Lond. *Washed Sulphur.*[1]

"Take sublimed sulphur, *a pound.* Pour upon it boiling water, that the acid, if there be any, may be entirely washed away; then dry it."

SULPHUR SUBLIMATUM LOTUM. Edin. *Washed sublimed Sulphur.*

"Take of sublimed sulphur, *one part;* water, *four parts.* Boil the sulphur for a short time in the water; then pour off this water, and by repeated affusions of cold water, wash away all the acid: lastly, dry the sulphur."

Dublin.

"Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water employed shall appear acid. This is known by means of litmus. Dry the sulphur on bibulous paper."

In subliming sulphur, a small portion of it is apt to be acidified, by attracting the oxygen of the heated air of the vessels, or the chamber in which the process is conducted. The quantity is however very minute, and is completely removed by the above processes; and the sulphur does not afterwards undergo any change from exposure to the air at the ordinary temperature of the atmosphere.

SUL'PHUR PRÆCIPITATUM. Lond. *Precipitated Sulphur.*[2]

"Take of sublimed sulphur, *a pound;* fresh burnt lime, *two pounds;* water, *four gallons.* Boil the sulphur and the lime together in water; then filter the liquor through paper, and drop into it as much muriatic acid as may be sufficient to precipitate the sulphur. Finally, wash this with repeated affusions of water, until it becomes tasteless."

In the first part of this process, a hydrogureted sulphuret of lime is produced, by the combination of the lime and sulphur occasioning a decomposition of a part of the water, the hydrogen of which unites with a portion of the sulphur, and forms a hydrosulphuret; while the oxygen with another portion forms sulphuric acid that combines with part of the lime: and thus the solution contains a small portion of sulphate of lime, and a sulphuret of lime combined with sulphureted hydrogen. This hydroguretted sulphuret is then decomposed by the muriatic acid, which unites with the lime, and forms a soluble muriate, while the sulphur is precipitated, and sulphureted hydrogen gas disengaged.

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[1] Flores Sulphuris loti, P. L. 1787. Soufre lavé (*F.*) Schwefel (*G.*) Zolfo lavato (*I.*)

[2] Lac Sulphuris, P. L. 1720. Sulphur precipitatum, P. L. 1787. Soufre précipité (*F.*) Schwefelniederschlag (*G.*) Zolfo Precipitato (*I.*)

Qualities.—Precipitated sulphur is white, with a very slight greenish tinge. When heated in a retort in a low heat, it acquires the colour of common sulphur, and water is deposited in the beak of the retort; from which circumstance, and the same degree of whiteness being produced when sulphur is sublimed into a vessel filled with steam, there is reason for supposing that precipitated sulphur owes its whiteness to the presence of a little water. It differs in no other respect from sublimed sulphur, and is an unnecessary refinement for the sake of appearance in the composition of ointments.

AQUA SULPHURETI KALI.[1] Dub. *Water of Sulphuret of Kali.*

"Take of sublimed sulphur, *half an ounce;* water of caustic kali, *nine fluid ounces.* Boil them together for ten minutes, and filter through paper. Preserve the preparation in well stopped phials. The specific gravity of this liquor is, to that of distilled water, as 1120 to 1000."

The name given to this preparation conveys an erroneous idea of its nature. When an alkaline sulphuret is dissolved in water, changes exactly similar to those we have mentioned (*Sulphur præcipitatum*) as taking place during the solution of an earthy sulphuret occur, altering the character of the product; and as the same happen by the direct combination of sulphur with a liquid alkali, this preparation is not a simple aqueous solution of sulphuret of potash, but, in fact, a solution of *hydrogureted sulphuret of potash*, or sulphuret of potash combined with sulphureted hydrogen.[2]

Qualities.—This solution has a slightly fœtid odour, and a nauseous, acrid, bitter taste. Its colour is reddish yellow, approaching to deep orange; its feel soapy; and it stains the cuticle a greenish black. Acids decompose it, precipitating the sulphur, and disengaging a portion of sulphureted hydrogen gas; and it is also decomposed by exposure to the air, the oxygen of which being absorbed by the sulphur forms sulphuric acid, which produces a sulphate with the potash; so that in process of time the whole is changed into a solution of sulphate of potash. Hence the necessity of preserving it in well stopped phials.

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[1] Liquore di solfuro di Potassa (*I.*)

[2] It was formerly denominated *Liquid Hepar*, or *Liquid Liver of Sulphur.*

Medical properties and uses.—This solution does not differ in its medicinal properties from the solid sulphuret of potash. It is, however, chiefly employed as an external application; and as such has been found very beneficial in tinea capitis, scabies, and herpetic eruptions. When given internally, the dose is from ♏xx. to fʒiſs. twice a day.

HYDRO-SULPHURETUM AMMONIÆ. Edin. *Hydro-Sulphuret of Ammonia.*

"Take of water of ammonia, sulphuret of iron, of each *four ounces;* muriatic acid, *eight ounces;* water, *two pounds and a half.* Pour the acid previously mixed with the water, on the sulphuret, and transmit the gas evolved, through the water of ammonia. Preserve the solution in well stopped phials."

SULPHURETUM FERRI. Dub. *Sulphuret of Iron.*

"Take of filings of iron, *six ounces;* sublimed sulphur, *two ounces.* Mix them, and expose them in a covered crucible to a gentle heat until they unite."

HYDRO-SULPHURETUM AMMONIÆ. Dub. *Hydro-Sulphuret of Ammonia.*

"Take of sulphuret of iron in coarse powder, *four ounces;* muriatic acid, *seven fluid ounces;* water, *two pints;* water of caustic ammonia, *four ounces.* Put the sulphuret of iron into a matrass, and gradually pour over it the acid diluted with water; and in a proper apparatus transmit the gas evolved from it through water of ammonia. Toward the conclusion of the operation apply a moderate heat to the matrass."

The proportions of the ingredients ordered in the Dublin formula for producing the sulphuret of iron enable them to unite at a low heat; and the combination is attended with a brilliant ignition, which takes place without the presence of air. The compound is of a grey colour intermixed with yellow, resembling bronze; has a metallic lustre, and a crystalline texture, with a considerable degree of brittleness, and when pulverized yields a black powder. According to Proust, 100 parts of it consist of 62·5 of iron, and 37·5 of sulphur.[1] The addition of the diluted muriatic acid, by oxidizing the iron, enables it to decompose the water, the hydrogen of which dissolving, part of the sulphur escapes, in the form of sulphuretted hydrogen gas, which combines at a low temperature with the ammonia of the solution through which it is made to pass. Mr. Cruikshank[1] advises the sulphuret of iron to be prepared "by raising a piece of iron in a smith's forge to a white heat, and then to rub it against the end of a roll of sulphur; the iron, at this temperature, immediately combines with the sulphur, and forms globules of pyrites (*sulphuret*), which should be received into a vessel filled with water; these globules are to be reduced to powder, and introduced into the proof, to which a sufficient quantity of the muriatic acid is to be added." Various other means have been also recommended for the preparation of the sulphuret; but the process directed by the Dublin College is easy and perfectly adequate for the purpose.

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[1] *Journal de Physique,* liii. 89.

Qualities. — Hydro-sulphuret of ammonia is of a dark green colour; has a very fœtid odour, and an acrid disagreeable taste. It is decomposed by the acids.

Medical properties and uses. — This preparation is a powerful sedative, lessening the action of the stomach, and of the arterial system in a remarkable degree; and even in moderate doses producing sickness, vomiting, and vertigo. It was first proposed as a remedy by Mr. Cruikshank, with the view of diminishing the morbid appetite and powerful action of the digestive organs, which attend those labouring under diabetes mellitus; and its subsequent use has been confined to the treatment of that disease. The dose to an adult should not at first exceed ♏v. or ♏vj. given in a large tumbler of water, three or four times a day; and the number of drops should be gradually increased, until a slight degree of giddiness takes place, when any further increase must be stopped.

AQUA SULPHURETI AMMONIÆ. Dub. *Water of Sulphuret of Ammonia.*

"Take of lime recently prepared, muriate of ammonia in powder, each *four ounces;* sublimed sulphur, hot water, of each *two fluid ounces.* Sprinkle the water on the lime, in an earthen vessel, and cover it until the lime fall to powder; mix this when cold by trituration with the sulphur and muriate of ammonia, avoiding the vapours; then put the mixture into a retort, and distil with a strong heat suddenly raised. Preserve the liquor thus obtained in a phial closely stopped with a glass stopper."

In this process the lime decomposes the muriate of ammonia, attracting its acid, and forming a muriate of lime, while the disengaged ammonia unites with the sulphur, one part of which, however, is converted into a hydro-sulphuret, by hydrogen arising from partial decomposition of the water, which, combining with the sulphuret of ammonia, thus produces a hydrogureted sulphuret of ammonia. It was formerly known by the name of *Fuming Liquor of Boyle*, having been first prepared by that philosopher.

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[1] *Rollo on Diabetes and Lues Venerea.*

Qualities. — This liquid is of a deep orange-colour, has a strong ammoniacal fœtid odour, and emits white fumes, owing, as Berthollet ascertained, to an excess of ammonia. The addition of an acid precipitates sulphur, and occasions the disengagement of sulphureted hydrogen gas. It consists of hydro-sulphuret of ammonia holding an excess of sulphur, which it gradually deposits, losing the property of fuming, and is then a nearly pure hydro-sulphuret of ammonia.[1]

We are ignorant of any medicinal use to which this preparation has been applied.

VEGETABILIA.

VEGETABLES.

THE collection of vegetables cannot be attended to by the apothecary, and, consequently, the directions necessary for that purpose are of less importance to him than a knowledge of the botanical characters of plants, and the appearances they assume when they are collected under proper circumstances and well dried: for inert plants are often introduced by the collectors among those which possess the most active properties; and from a careless or an improper mode of drying them, the medicinal virtues of the majority of plants are altogether destroyed. When, however, opportunities permit the apothecary to be his own collector, these should not be neglected; and the collection and drying of some plants, particularly foxglove and hemlock, should never be left to the common collector. The following general directions are therefore given in the London Pharmacopœia for collecting vegetable substances.

" VEGETABLES are to be gathered from the soil and situations where they spontaneously grow, in a dry season, and when no dew is upon them: they are to be collected every year, and any which shall have been longer kept are to be thrown away."

" ROOTS, for the most part, are to be dug up before their stems or leaves shoot forth." This direction may be followed when the roots are cultivated; but if the prior directions be attended to, it is not easy to conceive by what means the roots are to be discovered before the stems and leaves are put forth. The object of the order is the obtaining the roots with their active principles in the most concentrated state; and this may be effected by digging them up late in autumn, or early in winter, after the sap is completely detruded to the root, and the stem is withered but yet attached to the root, by which its situation is pointed out. If any change in the composition of the juices takes place during the cessation of vegetation in winter, it is probable that the same will happen, if the root, after being dug up, be preserved in sand.

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[1] *Thomson's Chemistry*, 4th edit. iii. 380.

"BARKS are to be collected at that season in which they are more easily separated from the wood." Spring is the season here alluded to; as at this time, after the sap begins to ascend, the bark is in general very easily separated. But a more important reason may be given for preferring this period, as in spring the active principles deposited in the proper cells of the bark are most abundant: thus, oak bark collected in spring contains four times more tannin than that which is collected in winter.[1]

"LEAVES are to be gathered after the flowers have expanded, and before the seeds are mature." These should be in the most perfect state, free from disease, and full grown.

"FLOWERS are to be gathered when just opened." There is, however, one exception to this rule in the red rose, which must be gathered before the buds are expanded.

"SEEDS are to be collected when they are ripe, and before they drop from the plant. They ought to be preserved in their seed vessels."

VEGETABILIUM PRÆPARATIO. Lond.

Preparation of Vegetables.

"VEGETABLES soon after they are gathered, except those which are to be used in the recent state, are to be lightly spread out, and dried as quickly as possible with a heat so gentle that their colour will not be altered; and then preserved in proper situations or vessels, where the light and moisture are excluded." When plants cannot be dried immediately on being gathered, they should be revived by immersing their stalks in water for twelve hours. When the leaves are the parts intended to be employed, these are then to be carefully freed from the stalks and laid in thin layers in baskets of willow stripped of its bark, in a drying room kept quite dark. They should then be exposed to a temperature of 140° Fah^t. for six or eight hours. When the leaves begin to shrivel they should be turned, and the same temperature continued, until they crumble readily in the hand. When the process has been well conducted the leaves should retain their green colour and their medicinal [1] properties. The vessels best adapted for preserving them are oil jars made perfectly clean and dry; closely covered and kept in a dry warm situation. It is better to preserve those leaves, the virtues of which are particularly connected with their colour, as hemlock and foxglove, in this state, than in the form of powder, a small portion only being occasionally powdered for current use.

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[1] Vide Biggins's Table, *Phil. Trans.* 1799.

" ROOTS, which are required to be preserved fresh, should be buried in dry sand. The SQUILL ROOT (*bulb*), before drying it, is to be denuded of the arid coats, and cut transversely into thin slices.

" PULPY FRUITS, if they be unripe, or ripe and dried, are to be placed in a damp situation, until they become soft: then press out the pulp through a hair sieve; afterwards boil with a gentle heat, frequently stirring; and finally, dissipate the water in a water-bath, until the pulp acquires a proper consistence.

" Over the bruised pods of CASSIA pour boiling water, so as to wash out the pulp, which is to be first pressed through a sieve with large holes, and afterwards through a hair sieve; then dissipate the water in a water-bath until the pulp acquires a proper consistence.

" Press through a sieve the pulp or juice of ripe and fresh fruits, without boiling them."

VEGETABILIUM EXSICCATIO.-Edin.

The drying of Herbs and Flowers.

" HERBS and flowers are to be dried by the gentle heat of a stove or a common fire, in such a quantity at once as will admit of the operation being very quickly finished: for by this means their powers are better preserved; the indication of which is the perfect preservation of their natural colour.

" The leaves of HEMLOCK, (*Conium maculatum*) and of other plants containing a subtile volatile matter, are, when dried, to be immediately reduced to powder, and preserved in well stopped glass vessels."

" The root (*bulb*) of the SEA-SQUILL, (*Scilla maritima*) freed from its external coat, is to be cut transversely into thin slices. The indication of its being properly dried, is the retention of its bitterness and acrimony after it has become friable." The directions of the Dublin College are similar. (See *Pulvis Scillæ* among the Powders.) After the squill has been properly dried, in which operation it loses seven-eighths of its weight, it must be kept in a dry place, as it is apt to retain its moisture in some degree, and become mouldy. It cannot, however, be long preserved in the state of powder without becoming almost inert.

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[1] The above is the method adopted by Mr. Battley, of Fore Street, whose attempts to improve Pharmacy deserve the thanks of the profession.

HERBARUM EXSICCATIO. Dub.

The Drying of Herbs.

" PUT the fresh leaves of the herb, gathered when it is in flower, into paper bags, and expose them to a low heat for an hour; then strew them lightly upon a sieve, and dry them as quickly as possible, taking care that their green colour be not injured by too much heat: but if the herbs are to be used under the form of powder, let them be immediately powdered, and the powder preserved in well closed opaque phials.

" Herbs and flowers from which oils and distilled waters are to be obtained, should be dried as soon as they are collected."

PULPARUM EXTRACTIO. Edin.

Extraction of Pulps.

" FRUITS which afford a pulp, if unripe, or if ripe and dry, are to be boiled in a small portion of water till they become soft; then the pulp is to be pressed through a hair sieve, and afterwards boiled in an earthen vessel with a gentle heat, stirring frequently to prevent it from burning, until it acquires the consistence of honey.

" In like manner the pulp of CASSIA FISTULA is to be boiled out from the bruised pod, and then brought to a proper consistence by evaporating the water.

" The pulps of recent and ripe fruits are to be pressed through a sieve without being previously boiled."

Dublin.

" If the fruits, the pulps of which are to be extracted, be unripe, or ripe and dry, they are to be boiled in a small portion of water until they become soft; and then the pulps pressed through a hair sieve, are to be reduced by slow evaporation to a proper thickness."

SUCCI SPISSATI. Edin.

Inspissated Juices.

" BEAT the fresh substance and press it strongly through a canvas bag in order to obtain the juice; which being put into a wide shallow vessel, and heated by means of boiling water saturated with sea salt, is to be reduced to the consistence of honey. The mass when cold, is to be put into glazed earthen vessels, and moistened with strong alcohol."

The juices of fresh vegetables obtained by expression contain, besides the sap of which they chiefly consist, mucilage, fecula, extractive matter, and the other proper juices of the plant. When newly expressed these matters are mixed together, and form a viscid heterogeneous fluid, which gradually separates, by rest, into two parts; the one formed of a deposit of all the insoluble components of the juice generally involved in mucilaginous matter; the other a clear liquor consisting of water holding some mucilage in solution, with the acids and salts, if any, and other soluble principles of the juice. As the clear liquor is that which is wished to be obtained for medical use, it is separated by first decanting it from the deposit, then filtering it repeatedly through a linen cloth, and adding about one-fortieth part of its weight of alcohol; after which it is allowed to remain at rest for some time, and again filtered previous to being put into the bottles in which it is intended to be preserved. The bottles should be kept in a cool cellar, and sunk up to the neck in sand.

Various other methods, also, are employed for depurating vegetable juices; but as these preparations are now almost obsolete, we do not think it necessary to detail them. By whatever means they are prepared, vegetable juices undergo chemical changes, and spontaneous decompositions from keeping, which must necessarily affect their virtues as medicines. They are therefore properly rejected from all the pharmacopœias.

The articles given in the Edinburgh Pharmacopœia under the title *Succi spissati* being associated by the London College with the extracts, and the difference between these preparations being scarcely sufficient to constitute a generic distinction, we have thought it proper not to alter the London arrangement in this respect, and have therefore placed the whole under the title *Extracts.*

GUM RESINS.

GUMMI-RESINÆ. Lond.

" Separate OPIUM very carefully from all extraneous matters, particularly those adhering to its outside. Let it be kept in a SOFT state fit for forming pills; and in a HARD state, such as can be produced by drying it in the heat of a water-bath, capable of being rubbed into powder.

"Those GUM-RESINS are to be preferred, which can be selected in such a state of purity as to require no purification. If, however, they appear to be less pure, boil them in water until they soften, and express them by a press through a hempen bag: then set them aside, that the resinous part may subside. Pour off the supernatant fluid, and evaporate it by the heat of a water-bath, adding the resinous part towards the end of the operation, and mixing it intimately with the gummy part so as to form one mass.

"Those GUM-RESINS which easily liquefy are to be purified by putting them into an ox bladder, and holding them in boiling water until they become soft enough to be freed from their impurities by pressing them through a hempen bag.

"Dissolve the BALSAM OF STORAX in rectified spirit, and strain it; then distil off the spirit by a gentle heat, until the balsam acquire a proper consistence."

Gum-resins which require to be treated in the above manner are unfit for internal use, and should be kept chiefly for forming plasters and for other external purposes. The degree of heat, although not more than sufficient for the liquefaction of the substances, is nevertheless enough to dissipate many of their odorous and volatile principles, and occasion some changes of composition. The directions for the treatment of opium are sufficient for freeing it from all the grosser impurities; and as the remedy remains unaltered, its strength is preserved unimpaired; whereas when spirit is employed, as was formerly ordered in the London Pharmacopœia, and is still by the Dublin College, it always suffers in efficacy.

OPIUM PURIFICATUM. Dub.[1] *Purified Opium.*

"Take of opium cut into small pieces, *one pound;* proof spirit, *twelve pints.* Digest with a gentle heat and frequent agitation, until the opium be dissolved: then filter the solution through paper, and distil it from a retort to separate the spirits; pour out the residuary liquor, and evaporate it until the extract be of a proper thickness. Purified opium must be kept in two states; one *soft*, proper for forming pills, and one *hard*, capable of being reduced to powder."

STYRAX PURIFICATA. Dub.[2] *Purified Storax.*

"Digest the storax in tepid water until it softens; then press it in a press between iron plates heated with boiling water; and finally, separate it from the water."

In this process a considerable part of the benzoic acid of the storax is dissipated by the heat of the iron plates, and the efficacy of the remedy consequently diminished. Hence the directions of the London College for purifying this substance are to be preferred.

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[1] Opium pur (*F.*) Mohnsaft (*G.*) Oppio puro (*I.*) Oppio puro (*S.*)

[2] Styrax in Körnern (*G.*) Storace depurato (*I.*)

OLEA EXPRESSA.

EXPRESSED OILS.

VEGETABLES yield two distinct species of oil, one of which is volatile at a high temperature, but the other cannot be volatilized without suffering decomposition. The first of these is termed *Volatile Oils*, the second, *Fixed Oils*; a name properly adopted by the Edinburgh College, and more suitable than *Expressed Oils*, the epithet given to this class of substances by the London and the Dublin Colleges.

FIXED OILS are obtained from fruits and seeds either by expression or decoction with water. The dicotyledons or seeds with two seed-lobes yield the greatest portion of oil. When the first process is employed, the fruit or seed is put into a strong hempen or hair bag, and subjected to the press; during the action of which the oil is forced out, generally combined with some other of the vegetable principles, which are afterwards separated by subsidence. The process is facilitated, and the quantity of oil increased, by heating the plates of the press, or previously roasting the seeds; but the oil thus obtained is more liable to become rancid, and hence the cold-drawn oils are always preferred for medicinal purposes. When the oil is to be obtained by decoction, the fruits or seeds are to be bruised previously to being boiled; and the oil which is separated is to be skimmed off from the surface of the water on which it swims.

Fixed oils have different degrees of consistence; they are, 1. Fluid at the ordinary temperature of the atmosphere, congealing in a temperature a little higher than the freezing point of water. 2. Concrete at the ordinary temperature of the atmosphere, and require a higher degree for their liquefaction. The first are denominated *fluid oils*; the second, *vegetable butters*.

1. Fluid fixed oils are generally inodorous and nearly insipid, or have a mild taste. They are transparent, viscid so as to run in streaks upon the sides of glass vessels, and have generally a slight tinge, which may be removed by digestion with charcoal. They are generally lighter than water, but differ

from each other in specific gravity. At about 600° of Fahrenheit they boil, and are then volatilized, but in a state of partial decomposition; the vapour readily catches fire, and burns with a yellow flame. When exposed to the atmosphere at a high natural temperature, such as exists in summer, or in heated rooms, the fixed oils expressed without heat become thick, lose much of their transparency, acquire a sharp taste and a disagreeable odour, and are then said to be rancid; but when heat has been used in their expression, they only become thick, and acquire resinous properties. In both cases the changes are produced by the absorption of oxygen; but in the first case, owing to the combination of the oxygen with some of the vegetable mucilage present in the cold-drawn oil, sebacic acid is formed; and by its diffusion through the oil the change in its properties is produced.

Fixed oils are insoluble in water; but they may be mingled through water, and kept suspended in it by means of mucilage or yolk of egg. They are, with one or two exceptions, nearly insoluble in alcohol and ether; but unite readily with each other, with volatile oils, and with resinous substances. They dissolve sulphur, and form a sort of balsam with it. With the alkalies they combine, and form soaps; but with the acids undergo decomposition: and when boiled with some of the metallic oxides, tough solid compounds or plasters are produced.

2. Concrete fixed oils possess nearly the same properties as the fluid fixed oils. They are, however, more soluble in alcohol and ether, but are not capable of entering so readily into combinations with the alkalies. The ultimate constituents of fixed oil are carbon and hydrogen.

For medicinal purposes these oils are required to be free from rancidity; consequently, they must be preserved in closed vessels, and carefully excluded from the air.

OLEUM AMYGDALARUM. Lond.[1] *Oil of the Almond.*

"Macerate almonds, either bitter or sweet, in cold water, for twelve hours, and bruise them; afterwards express the oil without heat."

OLEUM AMYGDALI COMMUNIS. Edin. *Oil of the Almond.*

"Take of fresh almonds, and bruise them in a stone mortar, then put them into a hempen sack, and express the oil by a press, without heat."

OLEUM AMYGDALARUM. Dub. *Oil of Almonds.*

"Bruise fresh almonds in a mortar; and then express the oil by a press, without heat."

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[1] Huile d'Amandes (*F.*) Mandelnolh (*G.*) Olio di Mandarleh (*I.*) Vādomcottay unnay (*Tam.*)

The oil obtained from both the sweet and the bitter almond is equally free from bitterness, if heat be not employed. Sixteen ounces of almonds yield about five ounces[1] of a bland inodorous oil, of a very slightly sweetish taste, which is at first a little turbid, but soon becomes clear. Its colour is a very pale greenish yellow, and its specific gravity ·932.[2] The oil from the bitter almond it is said, keeps longer without growing rancid than that from the sweet almond. It is soluble in ether, in the proportion of fʒx. to f℥iv. of ether.

Medical properties and uses. — This oil is demulcent and emollient, and is used in coughs and other pulmonary complaints, united with water by means of mucilage or the yolk of egg and sugar. A mixture of f℥iv. of almond oil, and ♏ viij. of acetate of lead, forms a useful injection at the commencement of gonorrhœa. The dose of the oil is from fʒiv. to f℥j.

OLEUM LINI. Lond. Dub. OLEUM LINI USITATISSIMI. Edin. *Oil of Linseed.*[3]

" Bruise the seeds of common flax, and afterwards express the oil without heat."

The proportion of oil thus obtained is about 20 per cent. of the seed employed. It is combined with a considerable portion of mucilage[4], has a strong disagreeable odour, and a nauseous taste; is not congealed except by a cold below 0° of Fahrenheit; and boils at 600° of the same scale. Its colour is a high yellow; and its specific gravity ·932.[5] Four ounces of alcohol are required to dissolve one drachm of it: but the same quantity of ether takes up a fluid ounce and a half.

Medical properties and uses. — Linseed oil is emollient, demulcent, and slightly laxative. On account of its nauseous taste, it is seldom used as an internal remedy, although it has been given with advantage in ileus when purgatives have failed. It is chiefly employed in the form of glyster, in flatulent colic, attended with costiveness, and in abrasions of the rectum; and is an useful application to burns, especially when combined ith lime water. The dose, when taken by the mouth, is from fʒſs. to f℥j.; but from f℥vj. may be given at once, per anum.

Officinal preparation. *Linimentum Aquæ Calcis.* E.

OLEUM RICINI. Lond.[6] *Castor Oil.*

" Bruise castor seeds, previously decorticated; and express the oil without heat."

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[1] About ℥iij more may be obtained by impregnating the marc with the steam of boiling water.

[2] Fabroni.

[3] Huile de graine de lin (*F.*) Leinöhl (*G.*) Olio di Lino (*I.*) Azéyte de Laxor (*S.*)

[4] The oil usually prepared on a great scale is more free from mucilage, the seeds being roasted before they are subjected to the press.

[5] Shaw's *Boyle*, ii. 346.

[6] Huile de Ricin (*F.*) Rizinusöhl (*G.*) Olio di Ricino (*I.*) Sitt. āmamāhā unnay (*Tam.*)

The mode of obtaining this oil, with its qualities and medicinal virtues, have been already noticed. The purer it is, the more soluble it is in alcohol of spec. grav. ·820. (See RICINUS, *Part* ii.)

OLEA DISTILLATA.

DISTILLED, *or* VOLATILE OILS.

VOLATILE OILS, as they are properly denominated by the Edinburgh College, are vegetable products, found in almost every part of the vegetable body, except the cotyledons of the seeds, the part in which almost always the fixed oils are contained. In some plants, the volatile oil exists in distinct vesicles, and is obtained by simple expression, but in general it can only be obtained by distillation; whence the name *Distilled Oils*, given to this class of substances by the London College: and as the odour of plants generally depends on their volatile oils, the Dublin College, following the example of the older chemists, who denominated them Essences, have adopted the term *Essential Oils.* The expressed volatile oils are now rejected from all the pharmacopœias; and the whole of those used in pharmacy retained, are procured by distillation.

Volatile oil is obtained from both recent and dried plants. When fresh plants are to be employed, they require no previous treatment; but when the plants are dry, or woods or barks are to be employed, the plants must be macerated in water for some time, and the woods and barks be previously rasped. The distillation is performed in the following manner. The plants, or the parts of them containing the oil, are to be put into a tinned copper still, and closely pressed down; after which, as much water is to be poured in as will be sufficient to cover the materials. The head of the still, which should be low, is then to be luted on; the fire lighted, and so regulated as to keep the contents of the still scarcely up to the boiling point; and the distillation continued, until the condensed vapour comes over nearly insipid and inodorous. During this process the volatile oil rises with the watery vapour, from which however, the greater part of it again separates, after it has remained at rest for some hours in a cool place, and either floats on the surface of the water, or sinks to the bottom, according to its specific gravity. The complete separation of the oil is effected by an instrument called a separatory (see *Part* i.);

and the water is to be again used for a second distillation of fresh materials, by which, as it is already impregnated with as much of the oil as it can dissolve, the product of oil of the second, and every subsequent distillation, will be consequently greater than that of the first; but it is not till " the tenth distillation, in some cases, that the produce of the oil attains its maximum."[1] By the same process, volatile oils are obtained from balsams, resins, gum-resins, and turpentines. They have not their characteristic qualities in perfection immediately after their distillation, but have a disagreeable empyreumatic odour; to dissipate which they must be allowed to stand for some days in vessels loosely covered with paper, before they be put into the bottles in which they are to be preserved, which should be opaque.

Although all volatile oils agree in their chemical properties sufficiently to constitute them members of the same class of substances, yet they differ greatly in their qualities from each other, and in the proportions in which they are obtained.

Volatile oils have a penetrating odour, and hot taste. They are completely evaporated when heated in the open air; a property which is taken advantage of as a test of their purity; for if they be adulterated with fixed oil, which is not unfrequently the case, by heating a small portion of the oil on a piece of clean paper, a greasy spot will remain, whereas if the volatile oil be pure, the paper will be left perfectly clean. In a higher temperature, volatile oils are readily ignited, and burn with a bright white flame, emitting a large quantity of black dense smoke; and with the production of a large proportion of carbonic acid and water.

Volatile oils exposed to the light, are changed in colour, or become colourless; when exposed to the air, they become more viscid, less odorous, redden the tincture of turnsole, and gradually assume the form of resins. These changes, Dr. Priestley ascertained[2], depend upon the absorption of oxygen; and hence the necessity of preserving volatile oils in small phials, completely full, and well corked. An oil which has become thick and scentless, may be rectified by re-distilling it, with some of the same kind of plant from which it was originally extracted, or with alcohol or sulphuric ether[3]; a limpid odorous oil comes over, and resin remains in the retort.

These oils are very sparingly soluble in water, and render it milky when agitated with it, communicating to it their odour: they are all soluble in alcohol, ether, and the fixed oils in various proportions. From their solubility in alcohol, they are sometimes adulterated with that fluid; but the fraud may be detected by agitating some of the suspected oil with water; when if the oil contain alcohol, an increase of temperature will be indicated by the thermometer, but not if the oil be pure.[1] The more expensive oils are also occasionally adulterated with the cheaper, particularly with oil of turpentine, which however is readily discovered by its peculiar odour, if a piece of paper be dipped in the suspected oil and dried with a gentle heat. They are also sometimes adulterated with castor oil; and as the mixture, when the ingredients are in equal proportions, is soluble in alcohol, the fraud cannot be detected by that test; but it is rendered obvious by the adulterated oil leaving a greasy stain upon paper, which has been touched with it, and held before the fire, whereas no stain is left by the genuine oil.

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[1] *Aikin's Dictionary of Chemistry*, Art. *Oil*.

[2] *Priestley on Air*, ii. 232.

[3] *Nicholson's Journal*, 8vo. vii. 68.

Volatile oils unite with sulphur, in a temperature sufficient to melt it, and form brown-coloured fœtid mixtures, which have been denominated *balsams of sulphur*. The alkalies and earths combine imperfectly with them, and constitute a class of bodies which the French chemists have denominated *saponules*. The action of the acids is much more violent than on the fixed oils: and several of them detonate when rubbed with oxymuriate of potash.

As medical agents, volatile oils are stimulant and aromatic. They are chiefly employed to remove nausea and flatulence, to correct the griping qualities of some purgatives, and the disagreeable taste of other remedies. They may be given, triturated with water and mucilage; or dropped first on a lump of sugar, and through its medium diffused in water, forming a solution of what has been denominated *oleum saccharum*. The quantity of sugar must be more than ten times the weight of the oil; and when they are well triturated together the oil becomes thus completely soluble in water, and may be diluted to any extent.

Some of the more stimulant of these oils are added to embrocations to be used as rubefacients in cases of numbness, pains, and paralytic affections of the joints.

The three British Colleges give the following general rules for the preparation of *volatile oils*.

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[1] Marqueron, *Annales de Chimie*, xlviii. 267.

OLEA DISTILLATA. Lond.

Distilled Oils.

"THE seeds of Anise and Carraway, the flowers of Chamomile and Lavender, the berries of Juniper and All-spice, the tops of Rosemary, and the entire plants of the other articles, dried, are to be employed.

"Put any one of these into an alembic, then pour in as much water as will cover it, and distil the oil into a large refrigeratory.

"The water which distils over with the oils of carraway, peppermint, spearmint, all-spice, and penny-royal, is to be preserved for use."

OLEA VOLATILIA. Edin.

Volatile Oils.

"As much water only is to be employed as will prevent empyreuma during the distillation. The distillation may be immediately commenced after a proper maceration; and the oil afterwards separated from the water.

"It is also necessary to observe, in preparing these oils and the distilled waters, that the quality of the substances, their texture, the season of the year, and similar circumstances, must occasion so many differences, that it is scarcely possible to give any certain and general rules which shall strictly apply to every example. Many things, therefore, which must be regulated by the judgment of the operator, are omitted, and the more general only given."

OLEA ESSENTIALIA. Dub.

Essential Oils.

"LET the oil be extracted by distillation, from the substance previously macerated in water, as much water being added during the distillation as may be sufficient to prevent empyreuma.

"In distilling fennel, peppermint, spearmint, penny-royal, and all-spice, the watery fluid which comes over in distillation with the oil is to be preserved for use according to the directions under the head of Distilled Waters."

Few of the volatile oils are prepared by the apothecary. The oils of anise, chamomile, juniper, origanum, rosemary, and pimento are usually imported into this country; while those of lavender, peppermint, spearmint, and penny-royal, are annually prepared on a large scale.[1]

OLEUM ANISI. Lond. Oleum Volatile Pimpinellæ Anisi. Edin. Oleum Seminum Anisi. Dub. *Oil of Aniseseed.*[2]

This oil is of a whitish or a pale straw-colour, has the odour of the plant, and a slightly pungent, bitter, sweetish taste. It crystallizes at 50° in flat tables. Sixteen pounds of anise-seeds yield about seven ounces of oil.[3]

Medical properties and uses.—This oil is used chiefly as a carminative; and as it is less pungent than many of the other volatile oils, it is better adapted for relieving flatulence in children. It is given in doses of from ♏v. to ♏xv. triturated with sugar.

OLEUM ANTHEMIDIS. Lond. Oleum Volatile Anthemidis Nobilis. Edin. *Oil of Chamomile.*[4]

The odour of this oil is unpleasant, and the taste pungent. When recently distilled the colour is a cærulean blue, but by exposure to light it changes to yellow. Eighty-two pounds of chamomile flowers yield eighteen drachms of oil.[5]

Medical properties and uses.—This oil is supposed to possess antispasmodic powers, and is therefore sometimes recommended in cramp of the stomach, and as an adjunct to purgative pills. The dose is from ♏v. to ♏x. but it is seldom used.

OLEUM CARUI. Lond.[6] Oleum Seminum Carui. Dub. *Oil of Carraway.*

Six pounds of carraway-seeds yield four ounces and a half of oil.[7] It has an aromatic odour, and a sweetish pungent taste; is viscid, and of a yellow colour. Its specific gravity is ·946.[8]

Medical properties and uses.—Oil of carraway is stimulant and carminative. It is chiefly used as an adjunct to purgative pills, and to cover the disagreeable flavour of other substances. The dose is from ♏j. to ♏x.

OLEUM SEMINUM FŒNICULI DULCIS.[9] Dub. *Oil of Fennel Seeds.*

Seventy-five pounds of fennel seeds yield thirty ounces of oil, which is colourless, and congeals at 50°. It has the odour of the plant, and a hot sweetish taste. Its specific gravity is ·997.[2]

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[1] *Lond. Med. Review, April* 1810. 156.

[2] Huile d'Anis (*F.*) Anisöhl (*G.*) Olio di Anice (*I.*)

[3] Baumé.

[4] Huile de Camomille Romaine (*F.*) Kamillenöhl (*G.*) Olio di Camamilla Romana (*I.*) Azeyte de Manganella de Botera (*S.*)

[5] Baumé.

[6] Huile de Carvi (*F.*) Kümmelöhl (*G.*) Olio di Carvi (*I.*) Azeyte de Alcorovea (*S.*)

[7] Baumé.

[8] Ibid.

[9] Huile essentiale de Fenouile (*F.*) Fenchelöhl (*G.*) Olio di Finoichio (*I*) Azey de l'Eneldo hinojo (*S.*)

Medical properties and uses.—The same as those of the plant. The usual dose is from ♏ij. to ♏xx. it is rarely used.

OLEUM JUNIPERI. Lond.[3] OLEUM VOLATILE JUNIPERI COMMUNIS. Edin. OLEUM BACCARUM JUNIPERI. Dub. *Oil of Juniper.*

Forty-eight pounds of bruised juniper berries yield six ounces of oil[4], of a specific gravity ·611.[5] Its odour is similar to that of turpentine, and the taste hot and acrid. It has a greenish yellow colour, is viscid, and deposites a fæculent matter when long kept. When genuine it is soluble in alcohol.

Medical properties and uses. — This oil is carminative, diaphoretic, and diuretic. It is sometimes given in dropsy, and may be added to foxglove when it is exhibited in the form of pills. The dose is from ♏ ij. to ♏ x. combined with water by means of sugar or mucilage.

OLEUM LAVANDULÆ. Lond. OLEUM VOLATILE LAVANDULÆ SPICÆ. Edin. OLEUM FLORUM LAVANDULÆ. Dub.[6] *Oil of Lavender.*

One pound nine ounces of this oil are obtained from eighty pounds of lavender flowers. The odour is very fragrant, and the taste warm and agreeable. Its colour is a very pale lemon yellow, and its specific gravity ·936.[7]

Medical properties and uses. — This oil is stimulant and cordial. It is chiefly used in hysteria and nervous headach, in doses of from ♏ j. to ♏ v. given on a lump of sugar.

OLEUM VOLATILE LAURI SASSAFRAS. Edin. OLEUM CORTICIS ET LIGNI SASSAFRAS. Dub. *Oil of Sassafras.*

Sixty pounds of bruised sassafras yield twelve ounces[8] of a viscid yellow oil, heavier than water, its specific gravity being 1·094.[9] Its odour is fragrant, and its taste hot and acrid, excoriating the lips when incautiously tasted. The Edinburgh College orders it to be distilled from the bruised root.

Medical properties and uses.—This oil is stimulant, and supposed to be also sudorific and diuretic. It has been given in chronic rheumatism, scurvy, and some cutaneous affections. The dose is from ♏ ij. to ♏ x. but it is scarcely ever ordered.—

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[1] Dehne. [2] Lewis.
[3] Huile essentiale de Genevrier (*F.*) Wachholder beeröhl (*G.*) Olio di Ginepro (*I.*)
[4] Dehne. [5] Lewis.
[6] Huille essentiale de Lavendelöhl (*G.*) Olio di Lavanda (*I.*) Azeyte del'Espliego (*S.*)
[7] Lewis. [8] Baumé. [9] Ibid.

OLEUM MENTHÆ PIPERITÆ. Lond. OLEUM VOLATILE MENTHÆ PIPERITÆ. Edin. OLEUM HERBÆ FLORESCENTIS MENTHÆ PIPERITIDIS. Dub.[1] *Oil of Peppermint.*

Four pounds of the dried plant yield three drachms of this oil.[2] Its odour is strong, and its taste very pungent, but at the same time impressing a sensation of coldness. Its colour is brownish yellow; but it becomes white when exposed to the light.

Medical properties and uses. — Oil of peppermint is stimulant and carminative. It is a common domestic remedy in cramp of the stomach, flatulent colic, and anorexia; and is usually rubbed up with sugar or mucilage. The dose is from ♏ j. to ♏ iij.

OLEUM MENTHÆ VIRIDIS. Lond. OLEUM HERBÆ FLORESCENTIS MENTHÆ SATIVÆ. Dub.[3] *Oil of Spearmint.*

This oil has a flavour similar to that of peppermint, but less grateful; its taste is warm and less pungent; its specific gravity ·975[4]; and its colour greenish.

Medical properties and uses. — The same as those of oil of peppermint. The dose is from ♏ ij. to ♏ v. given on a lump of sugar.

Officinal preparation. *Infusum Menthæ compositum.*

OLEUM ORIGANI. Lond. OLEUM VOLATILE ORIGANI MARJORANÆ. Edin. OLEUM HERBÆ FLORESCENTIS ORIGANI. Dub.[5] *Oil of common Marjoram.*

One hundred and fifty pounds of dried leaves of common marjoram yield fifteen ounces of oil[6], of a yellow colour, having the odour of the plant, and a hot acrid taste. Its specific gravity is ·940.[7]

Medical properties and uses. — On account of its acrid quality this oil is never exhibited internally. As a local stimulant it is sometimes used to allay the pain of tooth-ach, two or three drops on a piece of cotton being put into the carious tooth.

OLEUM PIMENTÆ. Lond. OLEUM VOLATILE MYRTI PIMENTÆ. Edin. OLEUM BACCARUM PIMENTÆ. Dub. *Oil of Pimento.*[8]

This oil has the agreeable odour of the pimento, with its pungent taste in an increased degree. It is of a reddish-brown colour, and is heavier than water.

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[1] Huile essentiale de Menthe Poivrée (*F.*) Pfeffermünzöhl (*G.*) Olio di Menta piperitide (*I.*)

[2] Baumé.

[3] Huile essentiale de Baumé verte (*F.*)

[4] Lewis.

[5] Huile essentiale d'oriang (*F.*) Dostöhl (*G.*) Olio di Origano (*I.*) Azeyte de origane Sylvestre (*S.*)

[6] Baumé.

[7] Ibid.

[8] Huile essentiale de Poivre de Jamaique (*F.*) Nelherpfefferöhl (*G.*) Olio di Pimento (*I.*)

Medical properties and uses. — It has the same properties as all-spice in a greater degree; and is given in dyspeptic affections, colic, and tympanitis, in doses of from ♏ iij. to ♏ v. rubbed with sugar, or in any proper vehicle.

OLEUM PULEGII. Lond. OLEUM HERBÆ FLORESCENTIS PULEGII. Dub. *Oil of Pennyroyal.*[1]

This oil is of a reddish-yellow colour, and resembles in its other qualities the oil of peppermint. Its specific gravity is ·978.[2]

Medical properties and uses. — It is stimulant and antispasmodic, but is scarcely ever used. The dose may be from ♏ j. to ♏ v. given on a lump of sugar.

OLEUM ROSMARINI. Lond. OLEUM VOLATILE RORISMARINI OFFICINALIS. Edin. OLEUM HERBÆ FLORESCENTIS RORISMARINI. Dub.[3] *Oil of Rosemary.*

Twenty-four pounds of the plant yield one ounce of a fluid colourless oil[4], the odour of which is less agreeable than that of the plant. It deposits crystals of camphor when long kept. Its specific gravity is ·934.[5]

Medical properties and uses. — It is stimulant; and frequently enters into the composition of liniments. The dose, as an internal remedy, may be from ♏ ij. to ♏ vj. but it is scarcely ever ordered.

OLEUM HERBÆ FLORESCENTIS RUTÆ. Dub. *Oil of Rue.*

Twenty-one pounds of Rue yield fifty-nine grains of[6] oil, which has the strong ungrateful odour and taste of the plant. When recently drawn the colour is yellow, but it deepens to a brown by age, and deposites a brownish resinous sediment. It congeals at 40° Fahrenheit.

Medical properties and uses. — Oil of rue is stimulant and antispasmodic. It is sometimes given in hysteria, and the convulsive affections of infants attendant on dentition; and is sometimes used as a rubefacient in palsy. The dose is from ♏ ij. to ♏ v. triturated with sugar or mucilage.

OLEUM HERBÆ JUNIPERI SABINÆ. Edin. OLEUM FOLIORUM SABINÆ. Dub.[7] *Oil of Savine.*

Two pounds of savine are said to yield five ounces of[8] oil. It is limpid, has the odour of the plant, and is extremely acrid to the taste. Its colour is yellow; but it becomes colourless on being kept exposed to light.

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[1] Huile essentiale de Menthe Peuliot (*F.*) Poleiöhl (*G.*) Olio di Puleggio (*I.*) Azeyte de Poleo (*S.*)

[2] Lewis.

[3] Huile essentiale de Romarin (*F.*) Rosmarinöhl (*G.*) Olio di Rosmarino (*I.*)

[4] Baumé.

[5] Lewis.

[6] Baumé.

[7] Huile esssentiale de Sabine (*F.*) Sevenbaumöhl (*G.*) Olio di Sabina (*I.*) Azeyt de Enebrio Sabina (*S.*)

[8] Murray.

Medical properties and uses.—This oil is the principle on which the virtues of savine depend; hence it possesses the same properties, and is applicable to the same purposes as the plant. The dose may be from ♏ ij. to ♏. vj. triturated with sugar.

ORLEUM CORNU CERVINI RECTIFICATUM. Dub. *Rectified Oil of Hartshorn.*

"Take of the oil which rises in the distillation of the volatile liquor of hartshorn, *three pounds;* water, *six pints.*

"Distil the oil, then remix it with the water, and redistil, repeating the distillations until the oil become limpid. It ought to be preserved in a dark place, in small phials completely filled, and closely stopped."

This empyreumatic oil is first formed by the decomposition of animal matter by heat; and arises from a new combination of part of the hydrogen and carbon of the substance distilled. As first obtained it is thick, of a dark colour, and has a very offensive odour; but by the rectification above ordered, it is rendered thinner, and less offensive.

Qualities.—Rectified oil of hartshorn is nearly colourless and transparent; has a strong, slightly aromatic odour, and a penetrating taste. It is very light and volatile, strikes a green colour with syrup of violets; is partially soluble in water, and unites readily with alcohol, ether, and oils. The acids form with it a thick saponaceous compound; and with the alkalies it forms a true soap. Exposure to light and air destroys its transparency, and gives it a deep brown colour.

Medical properties and uses.—This oil is stimulant, antispasmodic, anodyne, and sudorific. It was formerly regarded as a remedy of much efficacy in fever, particularly when given a few hours before the accession of the paroxysm of intermittents; and was also much employed in epilepsy, hysteria, and all convulsive affections. It is now almost discarded from practice, being only occasionally used as an external application to paralytic limbs. The dose may be from ♏ x. to ♏ xxx. in a sufficient quantity of water.

OLEUM SUCCINI. Lond.[1] *Oil of Amber.*

"Put the amber into an alembic, and distil from a sand-bath, with a fire gradually raised, an acid liquor, the oil, and a salt impregnated with the oil. Then redistil the oil twice."

OLEUM SUCCINI. Edin. *Oil of Amber.*

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[1] Huile de Succin (*F.*) Bernsteinöhl (*G.*) Olio di Succino Rettificato (*I.*)

"Take of amber in powder and of pure sand, *equal parts.* Mix them together in a glass retort, the capacity of which the mixture only half fills: and having adapted to it a large receiver, distil in a sand-bath, with a gradually augmented heat. An aqueous fluid tinged with a little yellow oil will first come over; then a yellow oil with an acid salt, and, lastly, a black and reddish oil. Pour the fluid from the receiver and separate the oil from the water."

OLEUM SUCCINI PURISSIMUM. Edin. *Pure Oil of Amber.*

"Distil the oil of amber mixed with six times its quantity of water, from a glass retort until two-thirds of the water pass over into the receiver. Then separate this purified volatile oil from the water, and keep it in well stopt phials."

OLEUM SUCCINI RECTIFICATUM. Dub. *Rectified Oil of Amber.*

"Take of the oil which comes over in the preparation of succinic acid, *a pound*; water, *six pints.* Distil until two thirds of the water have passed into the receiver: then separate the oil."

The oil of amber, as immediately procured by the distillation of amber, is of a dark colour, a thick consistence, and has a very fœtid odour; but by successive distillations it is rendered thinner, of a lighter colour, and at length is obtained nearly limpid.

Qualities.— Rectified oil of amber has a strong ungrateful odour, and a hot acrid taste. It is light, volatile, and inflammable, insoluble in water, and only partially soluble in alcohol.

James Bay Kimpton

Medical properties and uses.— Oil of amber is stimulant, antispasmodic, and rubefacient. It has been found serviceable in deficient menstruation, and in hysteria, epilepsy, and some other convulsive affections; but it is now scarcely ever administered as an internal remedy. The dose may be from ♏v. to ♏xij. combined with any distilled water by means of mucilage. It is more generally employed externally as a rubefacient in rheumatism and paralysis; and a mixture of f℥j. of this oil with f℥ſs of tincture of opium has been found beneficial as a friction to the affected part in tic doloureux; and in hooping-cough, rubbed upon the chest twice or three times a day.

Officinal preparation. *Spiritus Ammoniæ succinatus.* L.

OLEUM TEREBINTHINÆ. Dub.[1] *Oil of Turpentine.*

"Take of common turpentine, *five pounds*; water, *four*

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[1] Huile essentiale de Tirébenthine (*F.*) Terbenthinöhl (*G.*) Olio di Trementina (*I.*) Azeyte de Pino (*S.*)

pints. Distil the oil from a copper alembic. Yellow resin will remain in the retort after the distillation."

OLEUM TEREBINTHINÆ RECTIFICATUM.

Lond. Dub. *Rectified Oil of Turpentine.*

"Take of oil of turpentine, *a pint* (*two pints*, Dub.); water, *four pints.* Distil the oil (*a pint and a half of the oil*, Dub.)

OLEUM VOLATILE PINI PURISSIMUM. Edin. *Purified Oil of Turpentine.*

"Take of oil of turpentine, *one part*; water, *four parts.* Distil as long as any oil passes over."

The chemical qualities and medicinal properties of oil of turpentine have been already noticed. (See PINUS, *Part* ii.) The rectification of it is a troublesome process, and on account of the great inflammability of the vapours, much caution is required to prevent them from escaping through the lutings of the vessels, and catching fire. The rectified oil is a little lighter than the common oil, and completely free from any resinous admixture; but in other respects it has no peculiar excellence to recommend it. What remains in the retort is a thick resinous matter, and is denominated balsam of turpentine.

Medical properties and uses.— As has been already mentioned (*Part* ii.) I have had several opportunities of ascertaining the efficacy of oil of turpentine as a remedy for tape-worm. In every case in which I have administered it, the worm has been expelled, and the symptoms relieved. In general the animal has been voided of a livid hue, and evidently killed; but in one instance, in which a portion of five feet in length was passed after two fluid ounces of the oil had been taken, it was not livid, and when voided, exhibited evident signs of animation. In no instance have we perceived that the large doses of the oil, which were taken for the above purpose, produced any particular effect on the urinary organs. The more usual sensible effects are temporary intoxication, accompanied with considerable nausea, and sometimes vomiting, which, after two or three alvine evacuations, subside, and leave a degree of languor for ten or twelve hours. The pain of the stomach and side, which is an usual concomitant of the disease, is always removed by the oil. I have also given this oil in combination with cinchona, with evident benefit in rheumatism. In some, persons however, it has affected the kidney, producing pain and bloody urine, and in others its administration has produced a severe erythematic eruption over the body. The dose in rheumatism is fʒi. repeated every four hours; but in tænia it may be given in doses of fʒj. combined with fʒij. of syrup of poppies, repeated every six hours until the worm is expelled.

AQUÆ DISTILLATÆ.

DISTILLED WATERS.

IT has been already remarked that the volatile oil, on the presence of which the odour and the taste of plants in a considerable degree depend, is elevated during distillation with water; and a portion of it being retained in solution, the water thus acquires the odour and taste of the vegetable with which it is distilled. The qualities, however, thus acquired by water, are scarcely in any case sufficient to give it much power as a remedy; and hence, the distilled waters are generally employed as elegant vehicles only for the exhibition of more active substances.

The following general directions are given by the London College for the preparation of these waters.

"WATERS are to be distilled from dried plants, unless it be otherwise ordered, because fresh plants cannot be procured at all times of the year. When fresh plants are employed, the weight of them ordered is to be doubled.

"To every gallon of these waters add five fluid ounces of proof spirit, to preserve them from spoiling."

The Edinburgh College orders half an ounce of proof spirit, and the Dublin College half a fluid ounce of rectified spirit, to be added to each pound of the water.

Waters distilled from aromatic plants are more grateful when the plant is used in the dried state; but when delicate odorous flowers or herbs are employed, and the water acquires little more than odour by the distillation, the vegetable should always, if possible, be used in the recent state. Much care is required in conducting the process, to prevent any of the vegetable matter from being scorched, and to stop the distillation before the water is tainted by empyreuma. Notwithstanding, however, every attention that can be given, distilled waters, when newly prepared, have a very disagreeable empyreumatic odour, to dissipate which the vessels holding the waters must be left open to the air as long as any of the unpleasant odour remains; but afterwards it is essential for the preservation of the waters that they be preserved in closely corked vessels.

When long kept, many of the distilled waters undergo a species of decomposition; they become slightly sour, and a ropy viscid matter forms in them, owing to the essential oil they contain, undergoing decomposition, and changing into mucilage. The addition of the spirit is intended to prevent this from taking place, but it is not adequate to the effect intended; and a much preferable mode is to redistil the waters, after which they will keep good for several years.

Several of these waters are prepared on a great scale, of a superior quality to any that the apothecary can prepare, and cheaper.

AQUA DISTILLATA. Lond.[1] *Distilled Water.*

"Take of water, *ten gallons.* First distil four pints, which are to be rejected, and then distil four gallons. Preserve the distilled water in a glass bottle."

Edinburgh.

"Let water be distilled in clean vessels, until two thirds of the quantity employed have distilled over."

Dublin.

"Take of spring water, *twenty pounds.* Put them into a glass retort, and having rejected the first pound which comes over, let one gallon be distilled over with a gentle heat."

Water is almost universally diffused over the surface of the earth, but it is not found perfectly pure in any place, which is owing to its great solvent powers enabling it to take up a portion of many substances with which it must come into contact in its natural state. These impregnations, however, in spring and in river water, are not sufficient in general to give them any very sensible taste, or render them unfit for the ordinary purposes of life; but for many pharmaceutical purposes it is necessary that the water be absolutely free from every foreign ingredient. *Rain water* is the purest kind of natural water, but it nevertheless contains a portion of carbonic acid gas, and minute quantities of carbonate of lime, and of muriate of lime; in spring water, besides these ingredients, is found a small portion of muriate of soda: *well water,* which is spring water obtained from a greater depth, holds in solution a much larger portion of carbonic acid, and several earthy salts, the principal of which are sulphate and carbonate of lime; and *river water* is impregnated with different proportions of carbonate of lime, sulphate of lime, and muriate of soda. By distillation water is freed from these ingredients, and rendered nearly pure. The process should be conducted slowly, with a moderate degree of heat, and not continued longer than the time specified in the formulæ, otherwise a minute portion of the saline matter contained in the natural water passes over in the distillation.

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[1] Eau distillée (*F.*) Einfaches destillirtes Wasser (*G.*) Acqua Distillata (*I.*) Agua distillada (*S.*)

Although the necessity of distilled water for many pharmaceutical operations is very obvious, yet, by too much refinement in this particular having been erroneously insisted upon in the former London Pharmacopœia, apothecaries have of late years almost altogether neglected its use, even in cases where it is absolutely necessary. This error the College has avoided in its present Pharmacopœia, and therefore it may be expected that the directions for using it will be strictly attended to. Soft water is a more powerful menstruum of vegetable matter than hard water; and resinous substances cannot easily be mixed with water containing calcareous matter, even when mucilage is used, whereas they readily mix with very soft or distilled water. Perhaps it should be a rule to use filtered rain water only in all pharmaceutical operations in which distilled water is not particularly ordered. In extemporaneous prescriptions distilled water is often ordered, when there is no necessity for its use, and often neglected to be ordered when it is absolutely necessary. It may therefore be useful to know that it is necessary in formulæ containing any of the following substances: *Acidum citricum*, *Antimonium tartarizatum*, *Argenti Nitras*, *Cuprum ammoniatum*, *Ferrum tartarizatum*, *Hydrargyri Oxymurias*, *Liquor Ammoniæ*, *Liquor Plumbi Acetatis*, *Liquor Potassæ*, *Plumbi Superacetas*, *Solutio Muriatis Barytæ*, *Vinum Ferri*, *Zinci Sulphas*.

AQUA ANETHI. Lond. *Dill Water.*[1]

"Take of dill seeds bruised, *a pound*. Pour on them so much water, that during the distillation there may be a sufficiency to prevent empyreuma. Distil one gallon."

This water has an unpleasant odour and little pungency. It is used principally as a carminative for infants.

AQUA CARUI. Lond. *Carraway Water.*[2]

"Take of carraway seeds bruised, *a pound*. Pour on them so much water, that during the distillation there may be a sufficiency to prevent empyreuma. Distil a gallon."

Carraway water possesses a considerable share of the aromatic flavour and pungency of the seeds, and may be used for the same purposes.

AQUA CITRI AURANTII. Edin. *Water of Orange-peel.*[3]

"Take of fresh orange peel, *two pounds*. Add so much water that when ten pounds have been drawn off by distillation, there shall remain a quantity sufficient to prevent empyreuma. After due maceration distil ten pounds, to which add five ounces of diluted alcohol."

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[1] Eau d'Aneth puant (*F.*) Acqua di Aneto Puzzolente (*I.*)

[2] Eau de Carvi (*F.*) Feldkumel wasser (*G.*) Acqua di Carvi (*I.*)

[3] Eau d'Orange (*F.*) Pomeranzen wasser (*G.*) Acqua de Arancio (*I.*)

The water has the flavour only of the orange-peel.

AQUA CITRI MEDICÆ. Edin. *Water of Lemon-peel.*[1]

This is prepared in the same manner as the former; ten pounds of water being distilled from two pounds of fresh lemon-peel. It has the flavour of the peel, but is seldom used.

AQUA CINNAMOMI. Lond. Dub. AQUA LAURI CINNAMOMI. Edin. *Cinnamon Water.*[2]

"Take of cinnamon bark bruised, *a pound;* water, *a pint.* Macerate the bark in the water for twenty-four hours; then add a sufficient quantity of water to prevent empyreuma during the distillation. Distil a gallon."

This water is milky, and has the agreeable flavour and pungency of the cinnamon; but the oil being ponderous is apt to separate, leaving the water clear and insipid. It is a gentle stimulant and aromatic, but is chiefly used to cover the nauseous taste of other medicines.

AQUA LAURI CASSIÆ. Edin. *Water of Cassia Bark.*[3]

This is prepared from one pound of bruised cassia bark, in the same manner as the former, for which it is often substituted, being less expensive; but it is also less agreeable.

AQUA FŒNICULI. Lond. AQUA FŒNICULI DULCIS. Dub. *Fennel Water.*[4]

"Take of fennel seeds bruised, *a pound.* Pour over them as much water as will prevent empyreuma during the distillation. Distil a gallon."

AQUA MENTHÆ PIPERITÆ. Lond. Edin. AQUA MENTHÆ PIPERITIDIS. Dub. *Peppermint Water.*[5]

"Take of peppermint, *a pound and a half,* (*three pounds. Edin.*) Pour over it as much water as will prevent empyreuma during the distillation. Distil a gallon, (ten pounds, *Edin.*")

Peppermint water has the flavour and taste of the plant in a considerable degree. It is sometimes used alone as a carminative, but more generally for the purpose of covering the taste of other medicines.

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[1] Eau de Citronier (*F.*) Citronen wasser (*G.*) Acqua de Limone (*I.*)

[2] Eau de Cannelle (*F.*) Zimmt wasser (*G.*) Acqua di Cinamomo (*I.*)

[3] Eau de Casse (*F.*) Acqua di Cannella (*I.*)

[4] Eau de Fenouil (*F.*) Fenchel wasser (*G.*) Acqua di Finocchio (*I.*)

[5] Eau de Menthe poivrée (*F.*) Pfeffermunz wasser (*G.*) Acqua di Menta Piperitide (*I.*)

AQUA MENTHÆ VIRIDIS. Lond. AQUA MENTHÆ SATIVÆ. Dub. *Spearmint Water.*

"Take of spearmint, *a pound and a half.* Distil a gallon of water in the same manner as above."

AQUA PIMENTÆ. Lond. AQUA MYRTI PIMENTÆ. Edin. AQUA PIMENTO. Dub. *Pimenta Water.*[1]

"Take of pimento berries bruised, *half a pound;* water, *a pint.* Macerate the berries in the water for twenty-four hours; and with a sufficient quantity of water to prevent empyreuma, distil a gallon, (ten pounds, *Edin.*)"

This water has the odour and aromatic quality of the Jamaica pepper, but is not very agreeable to the taste. It is used as a carminative in dyspepsia.

AQUA PULEGII. Lond. Dub. AQUA MENTHÆ PULEGII. Edin. *Pennyroyal Water.*[2]

"Take of pennyroyal, *a pound and a half,* (*three pounds,* Edin.) Pour over it a sufficient quantity of water to prevent empyreuma, and distil a gallon, (ten pounds, *Edin.*)"

Pennyroyal water has the flavour and taste of the green herb. It is used for the same purposes as peppermint water.

AQUA ROSÆ. Lond. AQUA ROSÆ CENTIFOLIÆ. Edin. *Rose Water.*[3]

"Take of the petals of the hundred-leaved rose, *eight pounds,* (*six pounds,* Edin.) Pour over them as much water as will prevent empyreuma during the distillation. Distil a gallon, (ten pounds, *Edin.*)

AQUA ROSÆ. Dub. *Rose Water.*

"Take of the fresh petals of the damask-rose freed from their claws, *six pounds;* water, *a sufficient quantity to prevent empyreuma.* Distil a gallon."

This water has the agreeable odour of the rose in great perfection when properly prepared; which, however, is seldom the case, except when it is made on a large scale. It is very apt to spoil, unless it be rectified by a second distillation.

As rose water is perfectly free from any acrimony, and, except in point of odour, does not differ from simple distilled water, it is very generally employed in collyria, with acetate and superacetate of lead, and acetate and sulphate of zinc.

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[1] Eau de Poivreé de Jamaique (*F.*) Nelherpfeffer wasser (*G.*) Acqua di Pimenti (*I.*)

[2] Eau de Menthe peuliot (*F.*) Poley wasser (*G.*) Acqua di Puleggio (*I.*)

[3] Eau des Roses (*F.*) Rosin wasser (*G.*) Acqua di Rose (*I.*) Agna rosada (*S.*)

INFUSA.

INFUSIONS.

THESE are solutions of vegetable matter, obtained by maceration either in cold or boiling water. As in the case of decoction, the substance must be sliced or bruised if in a recent state, or pulverized if dry, in order to expose a large surface to the action of the menstruum. The term *Infusion*, in pharmaceutical language, is confined to watery solutions.

The substances which water, without the aid of boiling, can extract from vegetable matter submitted to its action, are gum, mucus, extractive, tannin, the bitter and narcotic principles, gum-resin, volatile oil, acids, and alkalies, a range which includes most of the principles on which the medicinal properties of plants depend. These principles, also, are less liable to be altered by infusion than by decoction, and, consequently, this form of preparation is to be preferred in every instance to which it is applicable. The strength and quality of the infusions are varied by the degree of temperature of the water: those made with hot water being necessarily stronger, but particularly in the case of bitters; cold infusions are more grateful.

In making infusions, when heat is required, the vessel is to be placed near the fire, so that the temperature of the water may be kept up to the necessary point for a sufficient length of time to produce the effect intended. Perhaps it might be an advantage, were the external surface of infusion pots covered with a metallic coating and polished; by which, as the heat would be much more slowly radiated than from the vessels usually employed, the effect of it would be more uniform and certain in promoting the solvent powers of the water.

Infusions, like decoctions, are liable to undergo spontaneous decomposition, if kept even for a few days; and therefore the London College has properly directed half a pint only to be made at one time, thus regarding them as extemporaneous preparations.

INFUSUM ANTHEMIDIS. Lond. INFUSUM ANTHEMIDIS NOBILIS. Edin. *Infusion of Chamomile.*

“ Take of chamomile flowers, *two drachms*; boiling water, *half a pint*. Macerate for ten minutes (twenty-four hours, Edin.) in a highly covered vessel, and strain.”

This infusion is clear, of a pale yellow colour, and has the odour and taste of the flowers. It precipitates solution of isinglass, whitish; infusion of yellow cinchona bark, white; solution of sulphate of iron and tincture of muriate of iron, black; solution of nitrate of silver, white; oxymuriate of mercury, pale brown; and acetate and superacetate of lead, yellowish white. These substances, therefore, are incompatible in prescriptions with this infusion.

Medical properties and uses.—It is a good stomachic and tonic; and may be given in dyspepsia and other complaints attended with debility of the stomach, in doses of from f℥j. to f℥ij. two or three times a day.

INFUSUM ARMORACIÆ COMPOSITUM. Lond. *Compound Infusion of Horse-radish.*

"Take of fresh horse-radish root, sliced, mustard seed, bruised, of each, *an ounce;* boiling water, *a pint.* Macerate for two hours in a lightly covered vessel, and strain; then add of compound spirit of horse-radish, *one fluid ounce.*"

This infusion, after it is strained, deposites by rest a whitish feculent matter, which should be separated. The supernatant clear part is of a sulphur yellow colour, and holds dissolved in every fluid ounce rather more than grs. x. of solid matter. It has a very pungent odour, and a hot biting taste; precipitates infusion of galls yellowish, and infusion of yellow cinchona bark white. The solutions of the pure alkalies do not affect it: but with their carbonates whitish precipitates are produced, as is also the case with solution of oxymuriate of mercury; while nitrate of silver produces one of a brown colour. Hence all those substances, except the pure alkalies, are incompatible in formulæ with this infusion. This infusion soon spoils in hot weather, and emits an offensive odour.

Medical properties and uses.—This is not an unusual form of giving horse-radish, the stimulant property of which is aided by that of the mustard. It is particularly serviceable in paralysis, and in dropsies occurring after intermittents. The dose is from f℥j. to f℥iij. given three or four times a day.

INFUSUM AURANTII COMPOSITUM. Lond. *Compound Infusion of Orange-Peel.*

"Take of dried orange-peel, *two drachms*; fresh lemon-peel, *one drachm*; cloves, bruised, *half a drachm*; boiling water, *half a pint.* Macerate for fifteen minutes in a lightly covered vessel, and strain."

This infusion has the agreeable compound odour and taste of the ingredients from which it is made. It is clear, and has the brown hue of deep-coloured sherry wine. It precipitates sulphate of iron black; and also produces precipitates with superacetate of lead, infusion of yellow cinchona bark, and lime-water.

Medical properties and uses. — It is an excellent and grateful stomachic. The dose may be from f℥j. to f℥iv. given twice or thrice a day.

INFUSUM CALUMBÆ. Lond. Infusum Colombæ. Edin. *Infusion of Calumba.*

"Take of calumba root, sliced, *one drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

The active matter of calumba is not all extracted by water. The infusion is inodorous, and tastes bitter. It is clear, and of a pale brown colour: affords precipitates with infusion of yellow cinchona bark, lime-water, and solution of oxymuriate of mercury, which, therefore, ought not to be ordered in conjunction with it. This infusion soon spoils.

Medical properties and uses. — Infusion of calumba is a good stomachic bitter in dyspeptic cases, and for restraining the nausea and severe vomiting which occur in pregnancy. It is also useful in the severe diarrhœa and vomiting which often attend dentition. The dose may be from f℥j ſs. to f℥iij. given several times a day.

INFUSUM CARYOPHYLLORUM. Lond. *Infusion of Cloves.*

"Take of bruised cloves, *a drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

This infusion contains all the active matter of the cloves; one fluid ounce holding nearly grs. vj. in solution. It is of a deep clear brown colour, has an aromatic odour, and a bitterish aromatic taste, and affords precipitates with infusion of yellow cinchona bark, the strong acids, and lime-water. Solution of sulphate of iron occasions a copious black precipitate; sulphate of zinc, superacetate of lead, and nitrate of silver, brown precipitates. It also decomposes tartarized antimony.

Medical properties and uses. — It is a warm and grateful stomachic; and may be advantageously used in dyspepsia, particularly when it arises from the abuse of ardent spirits, accompanied with a sensation of coldness at the stomach; in chronic gout, and flatulent colic. The dose is from f℥jſs. to f℥ij. given three or four times a day.

INFUSUM CASCARILLÆ. Lond. *Infusion of Cascarilla.*

"Take of cascarilla bark, bruised, *half an ounce*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

This is a clear, pale reddish brown infusion, having the aromatic odour of the bark, and a bitterish aromatic taste. It is incompatible in formulæ with the following substances, which it precipitates, lime-water, infusion of galls, infusion of yellow cinchona bark, solutions of nitrate of silver, acetate and superacetate of lead, sulphate of zinc, and sulphate of iron, which is slowly thrown down, of a pale olive colour.

Medical properties and uses.—It is a light stimulant, and tonic; and is advantageously given in some alvine fluxes, particularly such as occur after measles; and in the aphtha gangrenosa of infants. The dose may be from f℥jſs. to f℥iij.

INFUSUM CAT′ECHU COMPOS′ITUM. Lond. *Compound Infusion of Catechu.*[1]

"Take of extract of catechu, *two drachms and a half;* cinnamon bark, bruised, *half a drachm;* boiling water, *half a pint.* Macerate for an hour in a lightly covered vessel, and strain."

INFUSUM ACACIÆ CATECHU. Edin. *Infusion of Catechu.*

"Take of pulverized extract of catechu, *two drachms and a half;* cinnamon bark, bruised, *half a drachm;* boiling water, *seven ounces;* simple syrup, *one ounce.* Macerate the extract and bark with the water for two hours, in a covered vessel; then strain, and add the syrup."

In these formulæ it is intended that the whole of the soluble matter of the catechu taken up by the boiling water should remain dissolved after the infusion cools; but we find that a considerable portion is deposited. When the extract is triturated with water at 212°, as much of it is dissolved as the water can hold in solution, so that a preparation similar to this infusion may be immediately made by simply triturating the materials together. The addition of the syrup ordered by the Edinburgh College prevents the preparation from keeping longer than two or three days, although without the syrup it will keep good for months.

Qualities.—This infusion is inodorous, and has a slightly bitter austere taste, leaving, even when it contains no syrup, an agreeable sweetness in the mouth. The colour when the pale catechu is used, is a light brown or ale colour; but when the dark catechu is employed, a deep red brown. The following substances precipitate its tannin, or otherwise alter its properties, and therefore ought not to be ordered in formulæ with it; solution of isinglass, infusion of yellow cinchona bark, the strong acids, sulphate of iron, sulphate of zinc, oxymuriate of mercury, tartarized antimony, and superacetate of lead. The alkalies only deepen the colour.

Medical properties and uses.—This infusion, which is a powerful, agreeable astringent, is the best form under which catechu can be prescribed; and is very useful in long-continued diarrhœa, and other fluxes, proceeding from a weakened state of the intestines. The dose is from fʒj. to f℥iij. given after every liquid dejection, or every four hours.

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[1] Infusion de Cachou (*F.*) Katechu infusum (*G.*) Infuso di Cato (*I.*)

INFU'SUM CINCHO'NÆ. Lond. *Infusion of Cinchona Bark.*[1]

"Take of lance-leaved cinchona bark[2], bruised, *half an ounce;* boiling water, *half a pint.* Macerate for two hours in a lightly covered vessel, and strain."

This infusion contains a very considerable portion of the febrifuge matter of the bark; it is slightly turbid, has a pale pinkish yellow colour, more of the aromatic odour of the bark than the decoction possesses, and an equal degree of bitterness and astringency. It ferments spontaneously in the course of a few days during summer. It affords precipitates with the following substances; the strong acids, the alkaline carbonates, lime-water, solutions of sulphate of iron, sulphate of zinc, nitrate of silver, oxymuriate of mercury, oxide of arsenic, with subcarbonate of potash, and tartarized antimony; the aqueous infusions and decoctions of chamomile flowers, calumba, cascarilla, horse-radish, cloves, catechu, orange-peel, foxglove, senna, rhubarb, valerian, simaruba, and elm bark.

Any considerable portion of the tinctures also produces precipitates in this infusion. Some of these precipitates take place immediately, others not till after several hours have elapsed; the febrifuge virtue is perhaps not always destroyed by them, but the mixtures are certainly rendered inelegant. The sulphuric acid destroys the bitterness of the infusion, but not its astringency.

Medical properties and uses.—The cinchona in this form agrees better with most stomachs than when in powder; but its powers are necessarily diminished. It is chiefly serviceable in dyspepsia, and convalescencies, particularly after the maturation of the pustules in Ecthyma *vulgare.* The dose is from fʒj. to f℥iij. three or four times a day.

INFUSUM CINCHONÆ LANCIFOLIÆ. Edin. *Infusion of Cinchona.* INFUSUM CINCHONÆ SINE CALORE. Dub. *Cold Infusion of Cinchona.*

"Take of cinchona bark, bruised, *one ounce;* water, *one pound* (*twelve ounces by measure.* Dub.) Macerate for twenty-four hours, agitating frequently, and strain. (Triturate the bark with a little of the water, and whilst triturating, add the remainder; then macerate for twenty-four hours, occasionally agitating, and decant the clear liquor. *Dub.*")

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[1] Infusion de Quinquina (*F.*) Chinainfusum (*G.*) Infuso di China (*I.*)

[2] The other species of cinchona may be used in the same manner, and proportions.

The directions of the Dublin College for making this infusion are preferable to those of the Edinburgh College. It is nearly clear, but deposits by rest a small quantity of a brick red sediment. It is affected by the same substances, and its properties and use are the same as those of the former preparation, from which it differs chiefly in strength. The residuum may be used for some purposes, as its active matter is not nearly exhausted.

INFUSUM CUSPARIÆ. Lond. *Infusion of Cusparia.*

"Take of cusparia bark, bruised, *two drachms*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

This infusion is slightly turbid, and of a brownish colour; has a somewhat aromatic odour, and a bitter taste. The solution of sulphate of iron throws down a greenish yellow precipitate, and sulphate of zinc a yellowish one; nitrate of silver, oxymuriate of mercury, superacetate of lead: infusions of galls, and of catechu also, produce precipitates in it. Tartarized antimony is slowly decomposed. These substances, therefore, cannot properly be ordered in formulæ with this infusion.

Medical properties and uses.— This infusion possesses the stimulant and tonic properties of the bark, and is an useful form of giving it in typhoid fevers, obstinate bilious diarrhœa, and in dysentery, after proper evacuations. The tincture of cinnamon both covers its taste, and makes it sit lighter on the stomach. The dose is from f℥j. to f℥iij. given every three or four hours.

INFUSUM DIGITALIS. Lond. *Infusion of Foxglove.*[1]

"Take of dried foxglove leaves, *a drachm*; boiling water, *half a pint*. Macerate for four hours in a lightly covered vessel, and strain; then add of spirit of cinnamon, *half a fluid ounce*."

INFUSUM DIGITALIS PURPUREÆ. Edin. *Infusion of Foxglove.*

"Take of dried foxglove leaves, *one drachm*; boiling water, *eight ounces*; spirit of cinnamon, *one ounce*. Macerate the leaves with the water for four hours, in a lightly covered vessel; then, having added the spirit, strain."

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[1] Infusion de Digitale purpurine (*F.*) Fingerhut infusum (*G.*) Infuso di Digitale porporina (*I.*)

The faint odour and nauseous bitter taste of the foxglove are covered by the spirit of cinnamon in these infusions, which are clear, and of a brownish yellow colour. The solution of sulphate of iron slowly throws down in them a pale olive precipitate; superacetate of lead and infusion or decoction of yellow cinchona produce instantaneous and copious precipitates.

Medical properties and uses. — These infusions do not differ materially from the formula of Withering, and are well calculated to obtain speedily the diuretic effects of the remedy. The dose is from f℥ſs. to f℥j. given twice a day; or every eight hours, if the patient be strong, and the symptoms very urgent. For the necessary cautions to be observed in administering them, (See the article *Digitalis*, *Part* ii.)

INFUSUM GENTIANÆ COMPOSITUM. Lond. *Compound Infusion of Gentian.*

"Take of gentian root, sliced, orange-peel, dried, of each, *a drachm;* fresh lemon-peel, *two drachms;* boiling water, *twelve fluid ounces.* Macerate for an hour in a lightly covered vessel, and strain."

Edinburgh.

"Take of gentian root, sliced, *half an ounce;* dried orange-peel, bruised, coriander seeds, bruised, of each *a drachm;* diluted alcohol, *four ounces;* water, *one pound.* First pour on the alcohol, and, after three hours, the water; then macerate without heat for twelve hours, and strain."

Dublin.

"Take of gentian root, bruised, *two drachms;* fresh lemon-peel, *half an ounce;* dried orange-peel, *a drachm and a half;* proof spirit, *four ounces by measure;* boiling water, *twelve ounces by measure.* First, pour on the spirit, and, three hours afterwards, the water; then macerate for the space of two days, and strain."

The spirit ordered by the Edinburgh and Dublin Colleges, is intended to aid the solvent power of the water, and for preserving the infusion, which in summer very soon becomes ropy, and spoils; but as infusions can always easily be prepared, and boiling water takes up the greater part of the active matter of the ingredients, the spirituous addition, and the length of time ordered for the maceration, are certainly objectionable. The formula of the London College is free from both these objections, and produces a clear infusion, of a yellowish colour, with the agreeable odour of the orange-peel, and a pleasant bitter taste. The solution of superacetate of lead throws down a copious precipitate in this infusion; and sulphate of iron strikes a brown colour, but no precipitate takes place for twelve hours.

Medical properties and uses.— These are very common and elegant tonic and stomachic infusions. They are given in dyspepsia and chlorosis, united with chalybeates, or with alkalies; in atonic gout and diarrhœa, with absorbents and aromatics; in jaundice, with rhubarb and saline purgatives; and in dropsies, with squills and neutral salts. From f℥j. to f℥ij. may be given for a dose, three or four times a day.

INFUSUM LINI. Lond. *Infusion of Linseed.*[1]

" Take of linseed, bruised, *an ounce;* liquorice root, sliced, *half an ounce;* boiling water, *two pints.* Macerate for a quarter of an hour, near the fire, in a covered vessel, and strain."

INFUSUM LINI USITATISSIMI. Edin. *Infusion of Linseed.*

" Take of linseed, *an ounce;* liquorice root, bruised, *two drachms*; boiling water, *two pounds.* Digest for four hours, in a lightly covered vessel, and strain."

This infusion is a solution of mucus nearly in its pure state. It is clear, colourless, inodorous, and nearly insipid. Alcohol precipitates the mucus in white flocculi; and precipitates are also produced by acetate and superacetate of lead; hence these substances are incompatible in formulæ with this infusion.

Medical properties and uses.— Infusion of linseed is a cheap and very useful demulcent, in the various cases in which this class of remedies is indicated, and during the internal exhibition of corrosive muriate of mercury. The dose is f℥ij. frequently repeated.

INFUSUM MENTHÆ COMPOSITUM. Dub. *Compound Infusion of Mint.*

" Take of the leaves of spearmint, dried, *two drachms;* boiling water, *a sufficient quantity to afford six ounces by measure when strained.* Digest for half an hour in a covered vessel, and strain the liquor when cold; then add of refined sugar, *two drachms,* oil of spearmint, *three drops,* dissolved in *half an ounce* (fluid?) of compound tincture of cardamoms. Let them be mixed."

Medical properties and uses.— This is a grateful stomachic, and is also slightly diaphoretic. It may prove serviceable in anorexia and nausea, and as a vehicle to cover the disagreeable taste of other medicines. The dose may be from f℥j. to f℥iij. or *ad libitum.*

INFUSUM QUASSIÆ. Lond. *Infusion of Quassia.*

" Take of quassia wood, chipped, *a scruple;* boiling water, *half a pint.* Macerate for two hours in a lightly covered vessel, and strain."

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[1] Infusion de Semece de lin (*F.*) Leinsamen infusum (*G.*) Infuso di Semi di Lino (*I.*)

INFUSUM QUASSIÆ EXCELSÆ. Edin. *Infusion of Quassia.*

"Take of quassia wood, rasped, *half a drachm*; boiling water, *eight ounces*. Macerate for two hours in a lightly covered vessel, and strain."

The active matter of quassia taken up by water appears to be a pure, simple bitter. It is not altered by any of the substances usually employed as adjuncts to bitters; and by two only of the metallic salts. Nitrate of silver slowly throws down soft yellow flakes; and superacetate of lead, a white precipitate.

Medical properties and uses.— This infusion is a light tonic, very efficacious in dyspepsia, and other cases in which tonics are indicated. In hysteria it may be combined with purgatives and tincture of valerian; in atonic gout, with aromatics; and in dyspeptic affections with chalybeates, sulphate of zinc, or mineral acids. The dose is from f℥j. to f℥iij. given twice or thrice a day.

INFUSUM RHEI. Lond. *Infusion of Rhubarb.*[1]

"Take of rhubarb root, sliced, *a drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

Edinburgh.

"Take of rhubarb root, bruised, *half an ounce*; boiling water, *eight ounces*; spirit of cinnamon, *one ounce*. Macerate the root with the water in a covered vessel for twelve hours; then add the spirit, and strain."

These infusions differ chiefly in point of strength; and the Edinburgh is rendered pleasanter by the spirituous addition. Neither of them is quite clear; and both have a reddish brown colour, which is very much deepened by the addition of alkalies. The following substances either occasion precipitates in these infusions, or otherwise alter their properties, and are therefore incompatible in formulæ with them: the strong acids, and lime-water, solutions of sulphate of iron, sulphate of zinc, nitrate of silver, oxymuriate of mercury, superacetate of lead, and tartarized antimony; infusions of catechu, cinchona and cusparia.

Medical properties and uses. — These infusions are the best forms in which rhubarb can be given, when intended to act on the bowels. The dose of the former may be from f℥j. to f℥iv. and of the latter half the quantity, united with neutral salts or aromatics, as circumstances may direct.

INFUSUM ROSÆ. Lond. Dub. *Infusion of Roses.*[2]

"Take of the dried petals of the red rose, *half an ounce*;

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[1] Infusion de Rhubarbe (*F.*) Rhabarber infusum (*G.*) Infuso de Rabarbaro (*I.*)

[2] Infusion de Roses (*F.*) Rosen infusum (*G.*) Infuso di Rose (*I.*)

boiling water, *two pints and a half* (*three pounds by measure*, Dub.); diluted sulphuric acid, *three fluid drachms* (*three drachms by weight*, Dub.); refined sugar *an ounce and a half.* Pour the water on the rose petals in a covered glass vessel; then drop in the acid, and macerate for half an hour. Finally, strain the liquor, and add the sugar to it."

INFUSUM ROSÆ GALLICÆ. Edin. *Infusion of Red Roses.*

"Take of the dried petals of the red rose, *one ounce*; boiling water, *two pounds and a half*; sulphuric acid diluted, *half an ounce*; refined sugar, *one ounce.* Macerate the petals with the water in an earthen vessel, which has not been glazed with lead, for four hours; then pour in the acid, strain the liquor, and add the sugar."

This infusion is clear, of a beautiful red colour, and has an acid pleasantly austere taste. The addition of the sugar prevents it from being kept so long as it might otherwise be. The incompatible substances are those which are decomposed by the sulphuric acid. The sulphates of iron and of zinc, although they do not immediately alter it, yet slowly produce dark-coloured precipitates after some hours.

Medical properties and uses.— Infusion of roses is indebted for any astringency it possesses chiefly to the acid it contains. It is used alone in the colliquative sweats of phthisis; and as a gargle in cynanche tonsillaris; but it is chiefly employed as an elegant vehicle for more active remedies, particularly sulphate of magnesia, the nauseous taste of which it completely covers. The dose is from f℥ij. to f℥iv.

INFUSUM SENNÆ. Lond. *Infusion of Senna.*[1]

"Take of senna leaves, *an ounce and a half*; ginger root, sliced, *a drachm*; boiling water, *a pint.* Macerate for an hour in a lightly covered vessel, and strain the liquor."

INFUSUM CASSIÆ SENNÆ. Edin.

"Take of senna leaves, *six drachms*; ginger root, bruised, *a scruple*; boiling water, *nine ounces.* Macerate for an hour in a lightly covered vessel, and strain."

INFUSUM SENNÆ. Dub. *Infusion of Senna.*

"Take of senna leaves, *three drachms*; lesser cardamom seeds, freed from the capsules and bruised, *half a drachm*; boiling water, *as much as will yield, when strained, six ounces by measure.* Digest for an hour, and when the liquor is cold strain it."

These infusions should be clear, and have a deep red brown, nearly black, colour; with a slightly bitter, mawkish taste, which is scarcely corrected by the aromatic. In warm weather they spoil in forty-eight hours; and by simple exposure to the air attract oxygen, which occasions a yellowish precipitate of oxidized extractive, that is not purgative but gripes violently. On this account they should be preserved in a well closed vessel, or made only when wanted. They are also precipitated by the strong acids, the alkaline carbonates, lime-water, solutions of nitrate of silver, oxymuriate of mercury, superacetate of lead, tartarized antimony, and infusion of yellow cinchona bark, which are consequently incompatible in formulæ with these infusions.

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[1] Infusion de Senè (*F.*) Senna infusum (*G.*) Infuso di Senna (*I.*)

Medical properties and uses. — Both these infusions contain all the purgative principles of the plant, whilst the aromatics correct its griping properties: but there is perhaps a waste of senna in the London formula. They are given alone, or more generally combined with neutral salts and manna. The dose of the simple infusions may be from f℥iij. to f℥iv.; but with the addition of ʒj. of the tartrate of potash, or ʒiij. of the sulphate of magnesia, which are the usual adjuncts, f℥ij. are sufficient.

INFUSUM SENNÆ COMPOSITUM. Edin. *Infusion of Tamarinds and Senna.*

"Take of preserved tamarinds, *one ounce;* senna leaves, *one drachm*; coriander seeds, bruised, *half a drachm*; raw sugar, *half an ounce*; boiling water, *eight ounces.* Macerate in a covered earthen vessel, which is not glazed with lead, shaking frequently, and after four hours strain.

"It may be made also with double or triple the proportion of senna."

INFUSUM SENNÆ CUM TAMARINDIS. Dub. *Infusion of Senna and Tamarinds.*

Made in the same manner as the infusion of senna, except that ʒj. of tamarinds is added before straining the liquor.

These infusions are pleasanter than the simple infusions, the nauseous taste being well covered by the sugar and the acid of the tamarinds: in other respects they agree both in their properties, and in the effects of the incompatible substances; to which, however, must be added all salts having potash for their base.

INFUSUM SIMAROUBÆ. Lond. *Infusion of Simaruba.*

"Take of simaruba bark, bruised, *half a drachm*; boiling water, *half a pint.* Macerate for two hours in a lightly covered vessel, and strain."

This infusion is inodorous; has a slightly bitter taste, is clear, and of a greenish straw colour. The alkaline carbonates and lime water render it milky, and the following substances occasion precipitates: nitrate of silver, oxymuriate of mercury, superacetate of lead; infusions of galls, catechu, and yellow cinchona bark.

Medical properties and uses.—Simaruba infusion possesses the same properties as the bark, and is the best form of exhibiting the remedy, but it is not much used in this country. The dose is f℥ij. combined with tincture of opium, or an aromatic.

INFUSUM TABACI. Lond. *Infusion of Tobacco.*

"Take of tobacco leaves, *a drachm*; boiling water, *a pint*. Macerate for an hour in a lightly covered vessel, and strain."

This infusion is clear, of a reddish brown colour; has the odour of the plant in a slight degree, and a hot very acrid taste.

Medical properties and uses.—Tobacco infusion is chiefly intended to be given under the form of enema; for although it has been occasionally employed as an emetic, it cannot be recommended. As an enema it has been found useful in ileus, colica pictonum, incarcerated hernia and dysury; the practice of employing it in cases of suspended animation is now justly condemned.

INFUSUM VALERIANÆ. Dub. *Infusion of Valerian.*

"Take of valerian root, coarsely powdered, *two drachms*; boiling water, *seven ounces by measure*. Digest for an hour, and when the liquor is cold, strain."

Valerian infusion is clear, of a pale brown colour; with the odour of the valerian, and a bitterish pungent taste. Solutions of nitrate of silver, sulphate of iron, and infusion of yellow cinchona, afford precipitates with this infusion; and are therefore incompatible in formulæ with it.

Medical properties and uses.—This is an useful form of giving valerian in hysterical and nervous affections, in which the stomach will not always bear the powder. The dose may be from f℥jſs. to f℥ij. twice or thrice a day.

AQUA CALCIS COMPOSITA. Dub. *Compound Lime-water.*

"Take of raspings of guaiacum wood, *half a pound*; liquorice root, sliced and bruised, *an ounce*; sassafras bark, bruised, *half an ounce*; coriander seeds, *three drachms*; lime-water, *six pints*. Macerate without heat for two days, and strain."

This is a very inert preparation; and unless great care be taken to exclude the air completely from the vessel in which it is made, the lime-water will be decomposed.

AQUA PICIS LIQUIDÆ. Dub. *Tar Water.*

"Take of tar, *two pints*; water, *a gallon*. Mix, stirring with a wooden rod for a quarter of an hour; then, after the tar shall have subsided, let the liquor be strained, and preserve it in well-corked bottles."

Water readily dissolves a portion of tar; and is impregnated with empyreumatic oil, a small portion of resinous matter, and acetic acid, the components of the tar. The solution has the colour of Madeira wine, and a sharp empyreumatic taste.

Medical properties and uses. — Tar water is stimulant and diuretic; but to produce the latter effect, its operation requires to be aided by bodily exercise. It may prove useful in scurvy, and some cutaneous diseases; but the reputation which it obtained on the faith of the judgment of the worthy Bishop of Cloyne[1] has long since been lost, and it is now scarcely ever employed. From 0j to 0ij may be taken in the course of a day.

MUCILAGINES.

MUCILAGES.

MUCILAGES, correctly speaking, are simple solutions of gum or mucus in water; but the term mucilage, in pharmaceutical language, implies also any solution of a thick and adhesive nature, resembling in its appearance the solutions of gum.

MUCILAGO ACACIÆ.[2] Lond. *Mucilage of Acacia.*

" Take of acacia gum, in powder, *four ounces*; boiling water, *half a pint.* Rub the gum with the water, gradually added, until it forms a mucilage."

MUCILAGO ACACIÆ ARABICÆ. Edin. *Mucilage of Gum Arabic.*

" Take of gum arabic, in powder, *one part*; boiling water, *two parts.* Digest with occasional agitation, until the gum be dissolved; then strain the mucilage through linen."

MUCILAGO GUMMI ARABICI. Dub. *Mucilage of Gum Arabic.*

" Take of gum arabic, in coarse powder, *four ounces*; boiling water, *eight pints.* Digest with frequent agitation, until the gum be dissolved; then strain the mucilage through linen."

The straining through linen is very necessary, as the gum is often mixed with small pieces of wood and other impurities. The mucilage thus obtained is viscid, thick, and adhesive; semipellucid, and nearly colourless, if the gum be good. It has a faint, peculiar odour, is insipid, and may be kept without altering for a considerable time; but at length it becomes sour, and acetic acid is formed. The strong acids act on it as they do on gum; but when diluted, they do not alter mucilage. Alcohol converts it into a white curd; but proof spirit produces scarcely any alteration; no change is produced by spirit of nitric ether; but sulphuric ether and compound spirit of ether precipitate a thick, white, tenacious curd. Tincture of muriate of iron, even when diluted, converts mucilage into a brownish or orange-coloured, insoluble jelly; and acetate of lead gives a copious, dense, flaky precipitate; while no change is produced by the solutions of the following metallic substances: superacetate of lead, green sulphate of iron, sulphate of zinc, oxymuriate of mercury, and tartarized antimony; nor by the alkalies or neutral salts. Mucilage, like gum, serves to combine resins and oils with water, for which purpose, and to give tenacity to pills, it is much employed in pharmacy.

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[1] *Berkley's Siris*—passim.

[2] This appellation is certainly exceptionable. It is a mucilage of gum of the *Acacia vera.* The Edinburgh name is liable to nearly the same objection, except that the specific name of the plant is used, whereas *Acacia* is the name of the genus. Mucilage de Gomme arabique (*F.*) Schlieim de Arabiche Gummi (*G.*) Mucilagine de Gomma arabica (*I.*)

Medical properties and uses. — The properties of mucilage are the same as those of gum. (See *Part* ii.) It is the usual basis of demulcent mixtures for allaying the tickling which excites cough in catarrh and phthisis; and combined with opium and other narcotics, it is useful in diarrhœa, dysentery, calculous affections, and ardor urinæ. The dose of mucilage may be from f℥fs. to f℥j. frequently repeated.

Officinal preparations. *Mistura Guaiaci.* L. *Potio Carbonatis Calcis.* E.

MUCILAGO ASTRAGALI TRAGACANTHÆ. Edin. *Mucilage of Tragacanth.*[1]

"Take of gum tragacanth, in powder, *two drachms*; boiling water, *eight ounces.* Macerate for twenty-four hours, and triturate the gum carefully, that it may be dissolved; then strain the mucilage through linen."

MUCILAGO GUMMI TRAGACANTHÆ. Dub. *Mucilage of Gum Tragacanth.*

"Take of gum tragacanth, in powder, *two drachms*; water, *eight fluid ounces.* Macerate in a covered vessel until the gum be dissolved; then strain the mucilage through linen."

Tragacanth treated in this manner forms a thick, soft, very viscid mucilage, but the diffusion in the water is not uniform; nor does it become so even when boiled. It may be used in the same cases as mucilage of gum arabic. It has been recommended by M. Blaire, a French surgeon, as a remedy in burns. He directs linen rags, or bibulous paper soaked in the mucilage, to be applied over the affected part, which must be also kept moist with the mucilage for some days.[2] It is chiefly employed for making pills and troches.

MUCILAGO AMYLI. Lond. Edin. Dub. *Mucilage of Starch.*

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[1] Mucilage de gomme Adraganthe (*F.*) Schlieim de Tragauth (*G.*) Mucilagine di gomma Adragante (*I.*)

[2] Vide *London Med. Repository*, vol. iii. p. 257.

"Take of starch, *three drachms*; water, *a pint.* Rub the starch, gradually adding the water to it; then boil till a mucilage be produced."

Starch thus treated forms a strong, insipid, inodorous, opaline-coloured, gelatinous mucilage. In cases of phthisis, hectic fever, and abrasions of the stomach, it is given as a demulcent by the mouth; but it is more generally, and more advantageously exhibited in the form of enema in diarrhœa, dysentery, and abrasions of the rectum. It is the common vehicle for exhibiting opium in the form of enema.

DECOCTA.

DECOCTIONS.

THESE are aqueous solutions of the active principles of vegetables obtained by boiling. They are intended to afford more powerful remedies than can be obtained by the simple infusion of the same substances in cold or even in boiling water; but although by the operation of boiling the solvent power of the water is increased, and a greater quantity of the soluble parts of any vegetable body is consequently taken up by it, yet it does not always follow, that the medicinal virtues of decoctions are greater than those of infusions. On the contrary, if the active principles of a plant be volatile, or if they consist chiefly of extractive matter, this form of preparation often renders the remedy altogether inert, either by dissipating the volatile matters, or by favouring the oxidizement of the extractive, which in a continued temperature of 212° attracts the oxygen of the atmosphere so rapidly, that it is soon converted into a soluble insipid inert matter, and precipitated in the fluid. This is the case with some substances, which are nevertheless ordered to be prepared in this form by the Colleges, and which we shall particularly notice in treating of the individual decoctions.

For making decoctions, the substances employed must be divided, if in the dry state, by pulverization, or, if fresh, by slicing, so as to expose an extended surface to the action of the water; which is thus enabled to take up their soluble principles in a shorter space of time, a circumstance, for the reasons already stated, of much importance in the preparation of decoctions. By covering the vessel in which they are made, the action of the air is prevented from affecting the ingredients; but there is reason for believing, that by long coction in water, even in covered vessels, the constituents of some vegetable bodies re-act upon each other, and produce entirely new compounds, possessed of properties altogether different from those which they previously constituted. On this account decoctions should be quickly made; and when aromatic or volatile ingredients are to enter into them, these should not be boiled with the more fixed substances, but the decoction, after it is made, should be poured over them, and allowed to remain covered up until it is nearly cold, before it be strained. In general, however, it is better to strain decoctions while they are hot: for as boiling water dissolves a larger proportion of vegetable matter than it can retain in solution at a lower temperature, a deposit almost always takes place as the decoction cools; and if this be of active matter, it is lost by deferring the straining; whereas by straining the decoction while hot, the deposit can be mingled, by being shaken, with the clear fluid, when it enters into extemporaneous compositions, or when the dose of it is taken.

Decoctions, from the nature of their constituents, very soon ferment and spoil; consequently, they should be prepared in small quantities only, and never used, particularly in summer, forty-eight hours after they have been made.

DECOCTUM ALOES COMPOSITUM. Lond. *Compound Decoction of Aloes.*

"Take of extract of liquorice, *half an ounce;* subcarbonate of potash, *two scruples;* extract of spiked aloes, powdered, myrrh, powdered, saffron, of each, *a drachm;* water, *a pint.* Boil down to twelve fluid ounces, and strain; then add of compound tincture of cardamom, *four fluid ounces.*"

By the addition of the alkali in this preparation, the water is enabled to hold in solution a greater portion of the aloes than it could otherwise hold, while another portion is suspended by the mucilage of the liquorice and the myrrh. The addition of the tincture prevents any spontaneous decomposition from taking place. The taste of the decoction is extremely nauseous, notwithstanding the bitter of the aloes is in some degree covered by the liquorice. It is decomposed and a flaky precipitate thrown down in it by all the strong acids; corrosive muriate of mercury produces a pale brown precipitate, while tartarized antimony, sulphate of zinc, and superacetate of lead, produce white curdy precipitates: hence these substances are incompatible in formulæ with this decoction.

Medical properties and uses.—It is gently cathartic and emmenagogue; and is introduced as being analogous to the well-known *Beaume de Vie.* It may be given with advantage in habitual costiveness, dyspepsia, hypochondriasis, jaundice, and chlorosis, in the dose of from f℥ſs. to f℥ij. taken in the morning.

DECOCTUM ALTHÆÆ OFFICINALIS. Edin. *Decoction of Marsh Mallows.*

"Take of marsh mallow root, dried and bruised, *four ounces*; raisins stoned, *two ounces;* water, *seven pounds.* Boil down to five pounds; set aside the strained liquor until the dregs have subsided, and then decant it."

Marsh mallow roots contain a considerable quantity of mucus, which is thus extracted unaltered by water. The simple decoction of the roots is viscid, of a pale yellow colour, sweetish, and has a peculiar odour resembling that of boiled turnips. In the above preparation the raisins increase its sweetness, and render it more palatable.

Medical properties and uses.—This decoction is a useful demulcent in visceral inflammations, calculous affections, gonorrhœa, strangury, and other diseases of the urinary organs; and is supposed to be particularly indicated in inflammation of the kidneys after the abscess bursts. The dose is a cupful frequently taken; but in inflammation of the urinary organs, and in similar cases, it may be taken *ad libitum*, as common drink.

DECOCTUM ANTHEMIDIS NOBILIS. Edin. *Decoction of Chamomile.*

"Take of Chamomile flowers, dried, *one ounce;* carraway seeds, bruised, *half an ounce;* water, *five pounds.* Boil for a quarter of an hour, and strain."

DECOCTUM CHAMŒMELI COMPOSITUM. Dub. *Compoind Decoction of Chamomile.*

"Take of chamomile flowers, dried, *half an ounce*; fennel seeds, *two drachms;* water, *a pint.* Boil a little, and strain."

These decoctions contain in solution bitter extractive, and a small portion of essential oil. Were their mode of preparation a matter of any consequence, we would recommend the aromatic seeds not to be added till towards the conclusion of the boiling; but for the purposes of fomentation and glyster, for which they are intended, as much benefit is probably derived from the warm water, as the principles it holds in solution.

DECOCTUM CINCHONÆ. Lond. *Decoction of Cinchona.*[1]

"Take of lance-leaved cinchona bark bruised, *an ounce;* water, *a pint.* Boil for ten minutes in a lightly covered vessel, and strain the liquor while it is hot."

DECOCTUM CINCHONÆ LANCIFOLIÆ. Edin. *Decoction of Lance-leaved Cinchona.*

"Take of cinchona bark in powder, *one ounce*; water, *one pound and an half.* Boil for ten minutes in a covered vessel, and strain the liquor while it is hot."

DECOCTUM CORTICIS CINCHONÆ. Dub. *Decoction of Cinchona Bark.*

"Take of cinchona bark in coarse powder, *an ounce*; water, *a pint.* Boil for ten minutes in a vessel almost covered, and strain the liquor through a linen cloth while it is hot."

Cinchona bark is one of those substances which suffers by coction with water; and when the boiling is long continued, its virtues are so much impaired as to be nearly destroyed, owing to the oxidizement of the extractive, which is thus converted into an inert resin, and precipitated. Aware of this effect, the Colleges have properly limited the time of boiling to ten minutes, and ordered the vessel to be covered, and the liquor to be strained while it is hot. As the strained decoction cools, it becomes turbid, and lets fall a reddish or yellowish powder, according to the kind of the bark used: this, however, must not be rejected, but diffused through the clear decoction when it is about to be used in compounding extemporaneous mixtures, or when the dose is to be taken.

This decoction is more bitter but less aromatic than the infusion. It is effected by the same re-agents, and used in the same cases, and in similar doses, as the infusion. (See *Infusum Cinchonæ.*)

DECOCTUM CYDONIÆ.[2] Lond. *Decoction of Quince Seeds.*

"Take of quince seeds, *two drachms;* water, *a pint.* Boil them over a gentle fire for ten minutes, then strain."

Quince seeds abound with mucus, which is extracted by boiling water. It is considerably viscid, transparent, nearly colourless, insipid, and inodorous. It is coagulated by alcohol, acids, and most of the metallic salts, which, therefore, are incompatible in formulæ with it; and it must be used as soon as it is made, for it soon spoils, owing perhaps to its containing some of the other constituents of the seeds.

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[1] Decoction de Quinquina (*F.*) Chinadekokte (*G.*) Decotto di China (*I.*)

[2] This title would lead to the inferenc that the preparation is a decoction of the quince, and not of the seeds. It should have been *Cydoniæ Seminum.*

Medical properties and uses. — This is often preferred to the other mucilages as a local demulcent in tenesmus, and in aphthous affections and excoriations of the mouth. A diluted solution of it injected beneath the eye-lids is useful for obtunding the acrimony of the discharge in violent inflammations of the eye.

DECOCTUM DAPHNES MEZERII. Edin. *Decoction of Mezereon.*[1]

"Take of the bark of mezereon root, *two drachms*; liquorice root bruised, *half an ounce*; water, *three pounds.* Boil with a gentle fire down to two pounds, and strain."

This decoction is slightly mucilaginous, of a yellowish brown colour; has the sweet taste of the liquorice root with a slight degree of bitterness; and leaves in the mouth a sensation of heat and pungency, which, however, is scarcely felt until a few minutes after the dose has been swallowed.

Medical properties and uses. — This decoction was first made public by Dr. Alexander Russel[2] as an appropriate remedy for venereal nodes, arising from a thickening of the periosteum; and for removing those nocturnal pains with which venereal patients are afflicted. This opinion, however, has not been supported by experience; and Mr. Pearson[3] asserts, that it "has not the power of curing the venereal disease in any one stage, or any one form;" and adds, "except in an instance or two of lepra, in which the decoction conferred a temporary benefit, I have very seldom found it possessed of medicinal virtue, either in syphilis, or in the sequelæ of that disease, in scrophula, or in cutaneous affections." It has been given with seeming benefit in chronic rheumatism. The dose is from f℥iv. to f℥vi. three or four times a day.

DECOCTUM DIGITALIS. Dub. *Decoction of Foxglove.*

"Take of foxglove leaves dried, *a drachm*; water, *as much as will afford of strained liquor eight fluid ounces.* Place the vessel over a gentle fire, and as soon as the liquor boils remove it; then digest for a quarter of an hour, and strain."

This decoction is almost inodorous, and has a bitter nauseous taste. It is affected by the same re-agents as the infusion, and used in dropsies with the same intention. (See *Infusum digitalis.*)[1]

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[1] Décoction de Daphne mezereon (*F.*) Scioblbastrinde-dekokte (*G.*) Decotto di Daphne Mezereon (*I.*)

[2] *Medical Observations and Inquiries*, vol. iii.

[3] *Pearson on the Remedies for Lues Venerea*, p. 47.

DECOCTUM DULCAMARÆ. Lond. *Decoction of woody Nightshade.*

"Take of the stalks of woody nightshade sliced, *one ounce;* water, *a pint and a half.* Boil down to a pint, and strain."

This decoction appears to have been introduced into the pharmacopœia merely to fix the proportions of the ingredients. It has a strong unpleasant odour, and a bitter nauseous taste followed by a degree of sweetness.

Medical properties and uses.—It is possessed of diuretic and narcotic properties; and has been found useful in humoral asthma, dropsy, lepra vulgaris and alphos, and ptyriasis. The dose is from fʒiv. to f℥j. combined with any aromatic tincture, given three times a day.

DECOCTUM GEOFFRŒÆ INERMIS. Edin. *Decoction of Cabbage-tree Bark.*

"Take of cabbage-tree bark in powder, *one ounce;* water, *two pounds.* Boil with a gentle heat down to one pound, and strain."

This decoction has the colour of Madeira wine, a disagreeable odour, and a bitter mucilaginous taste. It is given to children in doses of fʒij. and to adults to the amount of fʒij. An overdose, or drinking cold water during its use, produces vomiting, fever, and delirium; effects which are to be remedied by castor oil, warm water, and acids. It is seldom employed in this country.

DECOCTUM GUAIACI COMPOSITUM. Edin. *Compound Decoction of Guaiacum.*[2]

"Take of guaiacum wood rasped, *three ounces;* raisins, *two ounces;* sassafras root sliced, liquorice root bruised, of each, *one ounce;* water, *ten pounds.* Boil the guaiacum wood and the raisins in the water over a gentle fire down to five pounds, adding the roots towards the end of the boiling; then strain."

This decoction derives less of its efficacy from the guaiacum than is generally imagined, a small portion of extractive matter only being taken up by the water. It is, however, supposed to be useful in chronic rheumatism, some cutaneous diseases, and in syphilis during a mercurial course; but, probably, at best it is only serviceable as a demulcent. It may be taken in divided doses, to the amount of Oj. or Oij. in the day.

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[1] For cases of the successful use of this decoction, in making which, however, the fresh leaves were employed instead of the dried, see *Darwin's Zoonomia*, vol. i. p. 326. 331.

[2] Decoction de Guajac composée (*F.*) Guajack-dekokte (*G.*) Decotto di Guajaco composito (*I.*)

DECOCTUM HORDEI. Lond. Dub. DECOCTUM HORDEI DISTICHI. Edin. *Decoction of Barley.*[1]

"Take of pearl barley, *two ounces;* water, *four pints and a half,* (*five pounds,* Edin.) First wash away any extraneous substances that may adhere to the barley; then, having poured on it half a pint of water, boil for a few minutes. This water being thrown away, let the remainder be added boiling; then boil down to two pints, and strain."

DECOCTUM HORDEI COMPOSITUM. Lond. *Compound Decoction of Barley.*

"Take of decoction of barley, *two pints;* figs sliced, *two ounces;* liquorice root sliced and bruised, *half an ounce;* raisins stoned, *two ounces;* water, *a pint.* Boil down to two pints, and strain."

Dublin.

"Take of decoction of barley, *four pints;* raisins stoned, figs sliced, of each, *two ounces;* liquorice root sliced and bruised, *half an ounce.* During the boiling add first the raisins, then the figs, and lastly, the liquorice root a short time before it is finished; when it is completed, the strained liquor ought to measure two pints."

The preparation of these decoctions is generally intrusted to nurses and the attendants of the sick-room; but a practitioner ought not to be ignorant of the best manner of making them, as his directions may be occasionally necessary. They are elegant and useful demulcents in cases of fever, phthisis, gonorrhœa, and strangury; and indeed in all acute diseases, given *ad libitum.* A few drops of tincture of opium may be added to the compound decoction, to obviate its laxative effect, where this might prove hurtful. Equal parts of this decoction, and of decoction of bark, form an excellent gargle in cynanche maligna.

DECOCTUM LICHENIS.[2] Lond. DECOCTUM LICHENIS ISLANDICI. Edin. *Decoction of Liverwort.*

"Take of liverwort, *an ounce;* water, *a pint and a half,* (*two pounds,* Edin.) Boil down to a pint, and strain."

DECOCTUM LICHENIS ISLANDICI. Dub. *Decoction of Iceland Liverwort.*

"Take of Iceland liverwort, *half an ounce;* boiling water, *a pint.* Digest for two hours; then boil for a quarter of an hour, and strain the liquor while it is hot."

In these decoctions the bitter principle of the lichen is united with its fecula, which is thus rendered extremely nauseous; and although its operation in the stomach may be thus augmented, yet few patients will be persuaded to take it in this form. The dose is from fʒiv. to f℥ij. three times a day. We have already stated its use as a demulcent, when freed from the bitter, and the mode of preparing it. (See *Lichen*, Part ii.)

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[1] Decoction d'Orge (*F.*) Gerstedekokte (*G.*) Decotto d'Orzo (*I.*)

[2] The impropriety of using the generic name only of the plant is here very obvious, articularly as another species of this extensive family, the *Lichen roccella,* is now introduced into the Dublin Pharmacopœia.

DECOCTUM MALVÆ COMPOSITUM. Lond. *Compound Decoction of Mallows.*[1]

"Take of mallows dried, *an ounce;* chamomile flowers dried, *half an ounce;* water, *a pint.* Boil for a quarter of an hour, and strain."

This decoction is intended for fomentations and enemas, for which purposes it answers sufficiently well.

DECOCTUM PAPAVERIS. Lond. *Decoction of Poppy.*[2]

"Take of the capsules of the white poppy bruised, *four ounces*; water, *four pints.* Boil for a quarter of an hour, and strain."

In making this decoction, the seeds should not be rejected, as they contain a considerable portion of bland oil, which, added to the mucilage and narcotic principle of the capsule, increases the emollient quality of the decoction. It is a very useful fomentation in painful swellings, and in the excoriations produced by the thin acrid discharge of ulcers, and those common to infants.

DECOCTUM QUERCUS. Lond. DECOCTUM QUERCUS ROBORIS. Edin. *Decoction of Oak Bark.*

"Take of oak bark, *an ounce*; water, *two pints*, (*two pounds and a half*, Edin.) Boil down to a pint, and strain."

From oak bark thus treated the greater part of its astringent matter is extracted. The decoction is nearly inodorous, has a brown colour, and the austere taste of the bark. It reddens tincture of litmus, and is precipitated by solutions of isinglass, infusion of yellow cinchona bark, the carbonates of the alkalies, the aromatic spirit of ammonia, lime-water, and solutions of sulphate of iron, acetate and superacetate of lead, oxymuriate of mercury, and sulphate of zinc, which are, therefore, incompatible in formulæ with it. The precipitates produced by the two last salts do not take place for a considerable time.

Medical properties and uses.— This is the usual form under which oak bark is exhibited. We have already noticed its internal use. (See *Quercus*, Part ii.) As a local astringent it is used as a gargle in cynanche and relaxation of the uvula; as an injection in passive uterine hæmorrhages, in leucorrhœa, and the gleety discharge which often remains after miscarriages. It is also a useful wash in piles and procedentia recti.

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[1] Decoctum pro enemate, P.L. 1787.

[2] Decoctum pro fomento, P.L. 1787.

DECOCTUM SARSAPARILLÆ. Lond. *Decoction of Sarsaparilla.*[1]

"Take of sarsaparilla root sliced, *four ounces*; boiling water, *four pints.* Macerate for four hours in a vessel lightly covered, and placed near the fire; then take out the sarsaparilla, and bruise it. Return it again to the liquor, and macerate in a similar manner for two hours more; then boil it down to two pints, and strain."

DECOCTUM SMILACIS SARSAPARILLÆ. Edin. *Decoction of Sarsaparilla.*

"Take of sarsaparilla sliced, *six ounces*; water, *eight pounds.* Digest for two hours in a temperature of about 195°, then take out the root and bruise it; in this state put it again into the liquor, and boil it with a gentle fire down to four pounds; then express it, and strain."

DECOCTUM SARSAPARILLÆ. Dub. *Decoction of Sarsaparilla.*

"Take of sarsaparilla root sliced, *an ounce and a half*; boiling water, *two pints.* Digest for two hours in a moderate heat; then take out the sarsaparilla, and bruise it; return it to the liquor, and again digest for two hours; then boil down to one half, express, and strain the liquor through a linen cloth."

We have already stated that the claims which sarsaparilla has to the attention of the practitioner as a remedy in syphilis are very trifling. This decoction may be regarded as little more than a solution of mucus, and a simple demulcent, which may be useful during the exhibition of mercury; and is found to be so in dysuria, and incontinence of urine arising from a morbid irritability of the bladder. It affords precipitates with lime-water, solution of muriate of barytes, and of superacetate of lead, which are therefore incompatible in formulæ with it.

DECOCTUM SARSAPARILLÆ COMPOSITUM. Lond. *Compound Decoction of Sarsaparilla.*

"Take of decoction of sarsaparilla boiling, *four pints*; sassafras root sliced, guaiacum root rasped, liquorice root bruised, of each, *an ounce*; bark of mezereon root, *three drachms.* Boil for a quarter of an hour, and strain."

Dublin.

"Take of sarsaparilla root sliced and bruised, *one ounce and a half*; raspings of guaiacum wood, bark of sassafras root, liquorice root bruised, of each, *two drachms*; bark of mezereon root, *a drachm*; boiling water, *three pints.* Digest the sarsaparilla, the guaiacum, and the sassafras, in the water, with a moderate heat for six hours; then boil down to one half, adding towards the end of the coction the liquorice and the mezereon; finally, strain."

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[1] Decoction de Sarseparille (*F.*) Sarsaparille-dekokte (*G.*) Decotto di Sarsaparilla (*I.*)

This decoction is an imitation of the once celebrated *Lisbon Diet-drink.* Its efficacy depends chiefly on the mezereon root bark, the quantity of which, therefore, ordered by the Dublin College is undoubtedly too small. It operates as a diaphoretic and alterative, and is found to be useful in the treatment of secondary syphilis, chronic rheumatism, and in lepra, and some other cutaneous affections. The dose is from f℥iv. to f℥vj. taken three or four times a day.

DECOCTUM SENEGÆ. Lond. DECOCTUM POLYGALÆ SENEGÆ. Edin. *Decoction of Seneka.*[1]

" Take of seneka root, *an ounce*; water, *two pints.* Boil down to a pint, and strain."

This decoction is of a brownish olive colour, inodorous, and has a hot pungent taste. Its virtues have been already discussed under the account of the root. (*Part* ii.) The dose is from f℥jſs. to f℥iij. taken three or four times a day.

DECOCTUM ULMI. Lond. Dub. DECOCTUM ULMI CAMPESTRIS. Edin. *Decoction of Elm Bark.*

" Take of fresh elm bark bruised, *four ounces*; water, *four pints*, (*five pints*, Edin.) Boil to two pints, and strain."

This decoction is thick, slightly mucilaginous, and of a brown colour; has a faint odour and a bitterish taste. Alcohol added to it produces a precipitate of light brown flakes; tinctures, therefore, in any considerable quantity, are inadmissible in formulæ with it. Its medicinal properties have been already noticed. (See *Ulmus*, Part ii.) The dose is from f℥iv. to f℥vj. taken twice or three times a day.

DECOCTUM VERATRI. Lond. *Decoction of White Hellebore.*

" Take of white hellebore root bruised, *an ounce*; water, *two pints*; rectified spirit, *two fluid ounces.* Boil the hellebore root with the water down to a pint, and strain; then, when the decoction is cold, add the spirit."

This decoction is stimulant, acrid, and cathartic; but its operation is too violent for internal use. As a lotion it often proves beneficial in scabies, tinea capitis, and other cutaneous eruptions; but it requires to be used with caution even as an external remedy.

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[1] Decoction de Polygale Senege (*F.*) Senegawurzel-dekokte (*G.*) Decotto di Poligala Senega (*I.*)

EXTRACTA.

EXTRACTS.

THESE are preparations obtained by evaporating aqueous and alcoholic solutions of vegetable substances, until a mass of a somewhat firm tenacious consistence remains. When water has been employed for making the solution, the extract may consist of gum or mucilage, extractive, tannin, cinchonin, saccharine matter, and the salts which the vegetable contained, and is termed a *Watery Extract*; but if alcohol has been the menstruum, resin, extractive, and all the above matters, except the gum, may be the ingredients, and the extract is denominated a *Spirituous Extract.* The latter appellation also is used if proof spirit be employed. The proper menstruum, therefore, for the preparation of any extract must be that fluid which most readily dissolves the peculiar principles on which the medicinal efficacy of the vegetable is supposed to depend.

When water is to be employed, the substance to be subjected to its action should be in the dried state, and coarsely powdered; and the solution, whether made by decoction or infusion, should be evaporated immediately after it is strained, and whilst it is yet hot; for, as we observed in treating of Decoctions, water at the temperature of 212° takes up much more of the active matter of vegetables than it can hold in solution at a lower temperature: therefore, by allowing them to cool, with the view of defecation, and evaporating the clear fluid only, a considerable portion of the active matter does not enter into the extract, and is necessarily lost. In performing the evaporation, a higher temperature than that of boiling water must not be employed; but it must, nevertheless, be conducted as quickly as possible; and therefore the evaporating vessel should be broad and shallow, and set in boiling water, or the water-bath recommended by Dr. Powell[1] should be employed. (See *Instruments*, Part i.)

Alcohol is used only in cases where the active ingredient of the vegetable is chiefly resin, or too volatile to bear the heat which is necessary for evaporating the water without being dissipated, or without suffering some decomposition, which would materially alter its properties. A tincture of the substance is first obtained, which is then evaporated by a very gentle heat in a water-bath; but the alcohol need not be allowed to evaporate in the air, as by employing a distilling apparatus, the greater part of it may be again obtained either altogether free from any vegetable principle, or containing a small portion only of the more volatile; which renders it fitter for being again employed for the preparation of the same kind of extract.

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[1] *Translation of the London Pharmacopœia*, p. 201.

Whether water, proof spirit, or pure alcohol be employed, the medicinal properties of the extract are always in some degree injured, the volatile parts are dissipated, and some of the fixed decomposed by the degree of heat required for the evaporation, particularly if water be the menstruum; or the proper extractive is oxidized, and consequently rendered inert. These are strong objections to this form of preparation; and, as Dr. Murray has properly observed, "with the exception of some of the pure bitters, as gentian; or some of the saccharine vegetables, as liquorice; there is no medicine perhaps but what may be given with more advantage under some other form."[1]

Extracts require to be kept in a hard and a soft state. A hard extract should be in such a state as to admit of its being easily pulverized, and the soft extract should be such as to retain the round form of a pill, without the addition of any powder. Both kinds should be preserved in a dry place; and the soft should be wrapped in oiled bladder, and kept in covered pots.

The London College does not arrange the extracts under the titles *Watery* and *Spirituous*, which is the arrangement of the Edinburgh College, or *Simple* and *Resinous*, which is that of the Dublin: and the London Pharmacopœia being our text book, we have followed its arrangement. The following general directions are given by the LONDON COLLEGE for the preparation of extracts.

"In preparing all kinds of extracts, evaporate the fluid as quickly as possible in a broad shallow dish placed in a water-bath, until the extract acquires a consistence proper for forming pills, and towards the end of the operation stir assiduously with a spatula.

"Sprinkle a small quantity of rectified spirit upon all the softer extracts."

The EDINBURGH COLLEGE gives its general directions for the preparation of the *Extracts by Water*, under the Extract of Gentian; and for the *Extracts by Water and Alcohol*, under the Extract of Bark.[2]

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[1] *System of Materia Medica, &c.* ii. 119.

[2] The following method of preparing narcotic extracts, invented by Mr. Battley, Chemist, Fore-Street, London, had been found to answer every purpose in preserving the green colour and the medicinal properties of the plants.

"Plants which from circumstances cannot be operated upon immediately after

EXTRACTA SIMPLICIORA. Dub. *Simple Extracts.*

"All simple extracts, unless otherwise ordered, are to be prepared according to the following rule.

"The vegetable matter is to be boiled in eight times its weight of water, which is to be reduced by boiling to one half; the liquor is then to be expressed, and after the fæces have subsided, to be filtered, and evaporated by the heat of boiling water, until it begins to thicken; and is to be, finally, inspissated by a medium heat, frequently stirring, until it acquires a consistence proper for forming pills.

"All extracts, when they begin to get thick, ought to be frequently stirred with a clean iron spatula. They may be reduced to a proper degree of thickness by means of a stove heated for the purpose.

"They ought to be preserved as much as possible from the contact of the air; and the softer ones are to be sprinkled with rectified spirit."

EXTRACTUM CACUMINUM ABSYNTHII. Dub. *Extract of Wormwood.*[1]

This is ordered to be prepared according to the above directions. It is nearly a simple bitter, the volatile oil being dissipated during the evaporation. It may be used in those cases for which bitters are commonly prescribed; but it is scarcely ever used. The dose is from gr. x. to ℈j. taken three times a day.

EXTRACTUM ACONITI. Lond. *Extract of Aconite or Wolfsbane.*[2]

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they are collected, must be revived by immersing their stalks in water for twelve or eighteen hours. Such as perfectly recover by this means, which will be known by the leaves becoming as fresh as when growing, are to be bruised and pressed; and the juice from them passed through a fine hair sieve, and immediately placed on the fire. Some time before it is raised to the boiling temperature, a quantity of green-coloured matter begins to float on the surface of the fluid: in the juice of some plants this matter is very considerable: it is to be carefully removed by means of a thin perforated tin dish. By the time the liquor boils, or soon afterwards, the green matter ceases to appear. The boiling is to be continued until rather more than half the fluid has been evaporated, when the decoction is to be put into a conical pan, and suffered to stand in it until cold. A large precipitation of dark green-coloured feculent matter will then be found to have taken place; from which the supernatant fluid is to be poured off, and again exposed to evaporation, until half of it is consumed; when it is to stand for precipitation.

"The precipitated matter from the second coction is by no means so green as the first. The remaining fluid is now to be suffered to boil till it acquires the consistence of syrup; when the matter which had been collected at the commencement by filtration and precipitation is to be mixed with it, and placed in a metallic pan in a water-bath, and further evaporated till of the consistence of an extract. In this latter part of the process, the operator must give his constant attention until it be quite completed. It is not necessary that the matter should be kept constantly stirred; but the operator ought never to suffer it to stick, or become hard on the sides of the pan; for, if it be allowed to harden, the extract loses its green colour; and in proportion to such loss is the deterioration of its medicinal virtues." *London Medical Repository*, vol. iv. p. 198.

[1] Extrait d'Absynthe (*F.*) Wermuth-extrakt (*G.*) Estratto d'Assenzo (*I.*)

[2] Extrait d'Aconit (*F.*) Eisenhütlein-extrakt (*G.*) Estratto d'Aconito Napello (*I.*)

"Take of fresh leaves of aconite, *a pound.* Bruise them in a stone mortar, sprinkling over them a little water; then express the juice, and, without any depuration, evaporate it to a proper consistence."

SUCCUS SPISSATUS ACONITI NAPELLI. Edin. *Inspissated Juice of Aconite.*

"Let fresh leaves of aconite be bruised; inclose them in a hempen bag and press them strongly, until they yield their juice; which is to be evaporated in flat vessels, heated with boiling water saturated with muriate of soda (*common salt,*) and immediately reduced to the consistence of thick honey.

"After the mass is cold, let it be put into glazed earthen vessels, and moistened with alcohol."

This extract, or inspissated juice, is the form under which Stoerk introduced wolfsbane into practice. It has an obscure brownish red colour, a disagreeable odour, and an acrid slightly styptic taste. Its medicinal properties are the same as those of the plant, but it is very seldom used. (See *Part* ii.) The dose at first should be gr. ½ only, and gradually increased to grs. vj. taken night and morning.

EXTRACTUM ALOES PURIFICATUM. Lond. *Extract of Aloes.*[1]

"Take of extract of spiked aloes in powder, *half a pound;* boiling water, *four pints.* Macerate for three days in a gentle heat, then strain the solution, and set it aside that the dregs may subside. Pour off the clear liquor, and evaporate it to a proper consistence."

This extract consists chiefly of the mucous and extractive matter of the aloes; but as during the inspissation the extractive is partially oxidized, and rendered less soluble, the extract is not completely soluble in water. It is employed in the same cases as the aloes, and is said to be less stimulant and griping. The dose is from grs. x. to grs. xv. given in the form of pills.

Officinal preparations. *Pulvis Aloes compositus.* L. *Pilulæ Aloes compositæ.* L. *Pilulæ Aloes cum Myrrha.* L.

EXTRACTUM ANTHEMIDIS.[2] Lond. EXTRACTUM ANTHEMIDIS NOBILIS. Edin. EXTRACTUM FLORUM CHAMÆMELI. Dub. *Extract of Chamomile Flowers.*

"Take of chamomile flowers dried, *a pound;* water, *a gallon.* Boil down to four pints, and strain the liquor while it is hot; then evaporate it to a proper consistence."

The Edinburgh extract is to be prepared in the same manner as the extract of gentian of that college; the Dublin, after the manner directed for the preparation of the simple extracts.

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[1] Extrait d'Aloes (*F.*) Aloeextrakt (*G.*) Estratto d'Aloe (*I.*)

[2] Extractum Chamæmeli, P. L. 1787. Extrait de Camomille romaine (*F.*) Kamillenextrakt (*G.*) Estratto di fiori di Camomillo (*I.*)

In these processes the volatile oil is dissipated, and a simple bitter extract remains, possessing scarcely any of the properties of the plant. It is of a deep brown colour, and has a grateful bitter taste, but scarcely any odour. It has scarcely any efficacy when used alone; but is a useful adjunct to rhubarb, and sulphate of zinc as a stomachic pill. The dose may be from grs. x. to ℈j. given twice or thrice a day.

EXTRACTUM BELLADONNÆ. Lond. SUCCUS SPISSATUS ATROPÆ BELLADONNÆ. Edin. *Extract of Belladonna.*[1]

"Take of fresh leaves of belladonna, *a pound.* Bruise them in a stone mortar, sprinkling a little water over them; then express the juice, and, without any separation of the sediment, evaporate it to a proper consistence."

The inspissated juice of the Edinburgh Pharmacopœia is to be prepared in the same manner as the inspissated juice of aconite.

This extract is inodorous, and has a bitterish taste. Its medicinal properties are the same as those of the plant, but weaker. The dose is from gr. j. gradually increased to grs. v. given in the form of pills.

EXTRACTUM CASCARILLÆ RESINOSUM. Dub. *Resinous Extract of Cascarilla.*[2]

"Take of cascarilla bark in coarse powder, *a pound;* rectified spirit of wine, *four pints.* Digest for four days, then pour off the coloured spirit, and filter. Boil what remains of the cascarilla in ten pints of water down to two pints; then evaporate the strained decoction, and at the same time distil the tincture from a retort, until both begin to thicken; then mix them together, and evaporate the mixture to a consistence proper for making pills. Lastly, mix the extracts intimately together."

This preparation is expensive, and does not appear to possess any peculiar advantages to recommend it. The dose is from grs. x. to ℈j. given twice or thrice a day, in the form of pills.

EXTRACTUM CINCHONÆ. Lond.[3] *Extract of Bark.*

"Take of lance-leaved cinchona bark bruised, *a pound;* water, *a gallon.* Boil down to six pints, and strain the liquor while it is warm. In the same manner boil it down again four successive times, in an equal quantity of water, and strain.

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[1] Extrait de Belladonne (*F.*) Belladonnaextrakt (*G.*) Estratto de l'erba di Belladonna (*I.*)

[2] Extrait de Cascarille (*F.*) Cascarillenextrakt (*G.*)

[3] Extractum Corticis Peruviani, P. L. 1754. Extrait de Quinquina (*F.*) Wässrigtes Chinaextrakt (*G.*) Estratto di China aquosa (*I.*)

Finally, mix the solutions together, and evaporate the mixture to a proper consistence.

"This extract ought to be kept in a *soft* state fit for making pills, and in a *hard* state that it may be reduced to powder."

Dublin.

"Take of cinchona bark in coarse powder, *a pound;* water, *six pounds.* Boil for a quarter of an hour in a vessel nearly covered; then filter the decoction while it is yet hot, and set it aside. Boil the residue again in the same quantity of water, and filter it in the same manner: repeat this a third time; and finally, mix all the liquors, and evaporate the mixture to a proper consistence.

"This extract should be kept in two states: one *soft*, fit for making pills; and the other *hard*, or in a state proper to be reduced to powder."

The operation of the same causes as those which we stated to be unfavourable to decoction as a form of preparation for the exhibition of cinchona, are still more hurtful to its efficacy in the form of extract; and, according to Sir John Pringle, the extract is less efficacious, even in equal quantities, than the simple powder. The extract, however, is not devoid of utility, and often sits very lightly on the stomach when the powder is rejected. It is usually ordered in doses of from grs. x. to ʒſs. dissolved in any distilled water; but it is necessary to observe, that, owing to the oxidizement of the extractive matter, the solubility of the extract is diminished during its formation: scarcely more than one half is soluble in water. It has a very bitter taste, but is less austere than the bark.

EXTRACTUM CINCHONÆ RESINOSUM. Lond. *Resinous Extract of Bark.*[1]

"Take of lance-leaved cinchona bark, bruised, *a pound;* rectified spirit, *four pints.* Macerate for four days, and strain. Distil the tincture in a water-bath, until the extract has acquired the due consistence."

EXTRACTUM CINCHONÆ LANCIFOLIÆ. Edin. *Extract of officinal Cinchona Bark.*

"Take of lance-leaved cinchona bark in powder, *one pound;* alcohol, *four pounds.* Digest for four days, and pour off the tincture. Boil the residue in five pounds of distilled water for fifteen minutes, and strain the decoction while it is hot through a linen cloth. Repeat this coction and straining with an equal quantity of distilled water, and evaporate the liquor to the consistence of thin honey. Distil the alcohol from the tincture, until it be reduced to a similar consistence. Then mix the inspissated liquors, and evaporate them to a proper consistence in a bath of boiling water, saturated with muriate of soda."

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[1] Extrait resineux de Quinquina (*F.*) Estratto di China colla resina (*I.*)

EXTRACTUM CINCHONÆ RUBRÆ RESINOSUM. Dub. *Resinous Extract of Red Cinchona Bark.*

This is ordered to be prepared in the same manner as the resinous extract of cascarilla.

The extract prepared by these processes has the bitter taste and the austereness of the bark, which it nearly equals in efficacy, and is more grateful to the stomach. It is altogether a preferable preparation to the watery extract; for, by the separate action of the spirit and the water, all the soluble and active principles of the drug are taken up: less heat is required to evaporate the menstruum; and, owing to the presence of the alcohol, the extractive matter absorbs less oxygen: indeed, the expence of the spirit, of which there is always some waste, is the only objection to its general use. The dose is from grs. x. to grs. xxx. formed into pills.

EXTRACTUM COLOCYNTHIDIS. Lond. *Extract of Colocynth.*[1]

" Take of the pulp of colocynth, *a pound*; water, *a gallon*. Boil down to four pints, and strain the liquor while it is hot; then evaporate it to a proper consistence."

This extract is a milder but less powerful cathartic than the pulp from which it is prepared, and with the addition of calomel forms an excellent purgative pill, which operates without griping. From grs. v. to ʒſs. is the usual dose.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM.[2] Lond. *Compound Extract of Colocynth.*

" Take of colocynth pulp, sliced, *six drachms*; extract of the spiked aloe, powdered, *one ounce and a half*; scammony, powdered, *half an ounce*; cardamom seeds, powdered, *a drachm*; boiling water, *two pints*. Macerate the colocynth pulp in the water with a gentle heat, for four days. Strain the liquor, and add to it the aloes and scammony; then evaporate it to a proper consistence, and towards the end of the inspissation mix in the cardamom seeds."

Dublin.

" Take of the pulp of colocynth, cut small, *six drachms*; hepatic aloes, *an ounce and a half*; scammony, *half an ounce*; lesser cardamom seeds, husked, *a drachm*; Castile soap softened with water, so as to have a gelatinous appearance, *three drachms*; hot water, *a pint*. Digest the colocynth in the water in a covered vessel, with a medium heat, for four days; express and strain the liquor, and add to it the aloes and scammony, first separately reduced to powder; then evaporate the mixture with a medium heat to a proper consistence for making pills, and towards the end of the inspissation add the gelatinized soap and the powdered seeds, and with frequent stirring mix the whole intimately together."

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[1] Koloquinthen-extrakt (*G.*)

[2] Extractum catharticum, P.L. 1745.

By this combination of powerful cathartic substances a purgative mass is obtained, more manageable and less irritating than any of its components separately taken. It forms a very useful pill for relieving the habitual costiveness of leucophlegmatic habits; and in obstinate visceral obstructions when combined with calomel, which is not decomposed, as might *à priori* be supposed. The dose is from gr. vj. to ʒſs. repeated every eight hours until it operates.

EXTRACTUM CONII. Lond. SUCCUS SPISSATUS CONII MACULATI. Edin. *Extract of Hemlock.*[1]

"Take of fresh hemlock, *a pound.* Bruise it in a stone mortar, sprinkling over it a little water; then express the juice, and without separating the sediment, evaporate it to a proper consistence."

The Edinburgh preparation is to be made according to the directions ordered for the preparation of inspissated juices.

SUCCUS SPISSATUS CICUTÆ. Dub. *Inspissated Juice of Hemlock.*

"Express hemlock leaves, gathered when the flowers are about to appear, and allow the juice to remain six hours to deposit the fæces; then evaporate the pure juice to a proper consistence with a moderate heat."

This extract, or inspissated juice, has a fœtid odour, a bitterish saline taste, and a dark olive colour. Although it be the form in which Stoerk introduced hemlock into practice, yet the narcotic power of the remedy is always impaired by this mode of preparation, and it is still more weakened by keeping, being nearly lost when a saline efflorescence begins to appear on the surface of the extract. It is used in the same cases as the powder, with which it is frequently mixed when it is to be made into pills; and is an useful adjunct to mercurials in cutaneous affections. Bergius recommends it in impotency.[2] The dose is gr. iij. gradually increased to ℈j. given twice or thrice a day.

EXTRACTUM ELATERII. Lond. *Extract of Elaterium.*[3]

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[1] Extrait de Ciqué (*F.*) Schierlings-extrakt (*G.*) Estratto del' erba della Cicuta (*I.*)

[2] Impotentiam virilem sub usu Conii curatam observavi, in viro quodam plusquam quadragenario, qui omnem erectionem penis perdiderat, postinde tamen plures liberos procreavit." *Bergius, Mat. Med.* i. 195.

[3] Elaterium (*F.*) Estratto del frutto della Momordica (*I.*)

"Slice ripe wild cucumbers, express the juice very gently, and pass it through a very fine hair sieve into a glass vessel; then set it aside for some hours, until the thicker part has subsided. Reject the thinner supernatant part, and dry the thicker part with a gentle heat."

ELATERIUM. Dub. *Elaterium.*

"Slice ripe wild cucumbers, and strain the juice very lightly expressed through a fine hair sieve into a glass vessel; then set it aside for some hours until the thicker part subsides; reject the supernatant liquor, and dry the fecula, laid upon a linen cloth and covered with another, by a medium heat."

The substance obtained by these processes is neither an extract nor an inspissated juice, but a peculiar modification of fecula combined with some very active principle which is deposited with it; and therefore the name adopted by the Dublin College is more appropriate than that imposed by the London College. It is very remarkable that the Edinburgh College has rejected so important a remedy from the last edition of its Pharmacopœia.

Medical properties and uses.—Elaterium is a very powerful hydragogue, and excites sickness, severe vomiting, and hypercatharsis, if it be not cautiously administered. On this account it is seldom used as a cathartic; but in ascites it often produces the entire evacuation of the fluid, when gamboge and crystals of tartar, foxglove, and every other remedy have failed. The best mode of administering it is to give it in divided doses of gr. ſs. each, every hour, until it begins to operate. It may, however, be given to the extent of gr. iij. for a dose.

EXTRACTUM CACUMINUM GENISTÆ. Dub. *Extract of Broom Tops.*

This extract is to be prepared in the same manner as the extract of wormwood. It is said to be diuretic, but its efficacy is doubtful, and it is scarcely ever employed. The dose is from ʒſs. to ʒj. or more.

EXTRACTUM GENTIANÆ. Lond. EXTRACTUM RADICIS GENTIANÆ. Dub. *Extract of Gentian.*[1]

"Take of gentian root, sliced, *a pound;* boiling water, *a gallon.* Macerate for twenty-four hours; then boil down to four pints, strain the liquor while it is hot, and evaporate it to a proper consistence."

EXTRACTUM GENTIANÆ LUTEÆ. Edin. *Extract of Gentian.*

"Take of gentian root, *any quantity.* Having sliced and bruised it, pour upon it eight times its weight of boiling water. Boil down to one half, express the liquor strongly, and strain it. Evaporate the decoction immediately to the consistence of thick honey, in a bath of boiling water saturated with muriate of soda."

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[1] Extrait de Gentiane (*F.*) Enzian-extrakt (*G.*) Estratto di Gentiana (*I.*)

The bitter principle of gentian root is not injured by this form of preparation. The extract is inodorous, very bitter, black, shining, and tenacious. It is chiefly used as a vehicle for the exhibition of the metallic oxides. The dose is from grs. x. to ʒſs. given twice or thrice a day.

EXTRACTUM GLYCYRRHIZÆ. Lond. Dub. *Extract of Liquorice.*

"Take of liquorice root sliced, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints; strain the hot solution, and evaporate it to a proper consistence."

There is scarcely any of this extract prepared by the apothecary; the pure extract of liquorice sold in the shops under the name of *refined liquorice* being prepared from the impure extract of commerce, by dissolving it in water, straining, and inspissating it in the usual manner. It is an useful demulcent for allaying tickling cough, as from its tenacity it hangs about and sheathes the fauces.

Officinal preparations. *Pilulæ opiatæ*. E. *Pilulæ scilliticæ*. E. *Trochisci Glycyrrhizæ glabræ*. E. *Trochisci Glycyrrhizæ cum Opio*. E.

EXTRACTUM HÆMATOXYLI.[1] Lond. EXTRACTUM HÆMATOXYLI CAMPECHIANI. Edin. EXTRACTUM SCOBIS HÆMATOXYLI. Dub. *Extract of Logwood.*

"Take of logwood rasped, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints; strain the hot liquor, and evaporate to a proper consistence."

This extract is almost inodorous, has a sweet austere taste, and a deep ruby colour. It becomes extremely brittle when kept. It is an useful astringent in the protracted stage of diarrhœa and dysentery. The dose is from grs. x. to ʒſs. dissolved in cinnamon water or peppermint water.

EXTRACTUM RADICIS HELLEBORI NIGRI. Edin. Dub. *Extract of Black Hellebore Root.*[2]

This is to be prepared from the bruised root, after the manner directed for the extract of gentian by the Edinburgh College, and the extract of wormwood by the Dublin College.

EXTRACTUM HUMULI. Lond. *Extract of Hops.*

"Take of the strobiles of the hop, *four ounces*; water, *a gallon*. Boil down to four pints; strain the hot liquor; and evaporate it to a proper consistence."

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[1] Extractum Ligni Campachensis, P.L. 1745. Campecheholz-extrakt (*G.*)

[2] Extrait d'Ellebore (*F.*) Schwarz Niesenwurz-extrakt (*G.*)

This extract is inodorous; and has the bitter taste peculiar to the hop. We have found it an useful anodyne in gout, acute rheumatism, and cases which do not admit of the use of opium. The dose is from grs. v. to ℈j. given in the form of pills, or dissolved in any aqueous vehicle.

EXTRAC'TUM HYOSCY'AMI. Lond. Succus spissatus Hyoscyami nigri. Edin. Succus spissatus Hyoscyami. Dub. *Extract of Henbane.*[1]

"Take of fresh leaves of henbane, *a pound.* Bruise them in a stone mortar, sprinkling on them a little water; then press out the juice, and without separating the sediment, evaporate it to a proper consistence."

This extract has a disagreeable slightly fœtid odour, and a nauseous, bitterish, subsaline taste. It is possessed of considerable narcotic powers, and is used as a substitute for opium in nervous affections, mania, gout, rheumatism, and all painful complaints, in which it is wished to avoid the costiveness which opium is apt to induce. A solution of it in water, in the proportion of one drachm to the ounce, dropped into the eye, dilates very much the pupil; and has been used, on the recommendation of Professor Himly, for facilitating the operation for cataract; and also in contracted pupils not accompanied by adhesion of the iris to the capsule.[2] The dose is from grs. iij. to ℈j. given in the form of pills.

EXTRAC'TUM JAL'APÆ.[3] Lond. *Extract of Jalap.*

"Take of jalap root powdered, *a pound*; rectified spirit, *four pints*; water, *ten pints.* Macerate the jalap root in the spirit for four days, and decant the tincture. Boil the residue in the water down to two pints. Then strain separately the tincture and the decoction; distil the former, and evaporate the latter, until both begin to thicken. Lastly, mix the extract with the resin, and evaporate the mixture to a proper consistence."

"This extract should be kept in a *soft* state fit for forming pills, and in a *hard* state, so that it may be reduced to powder."

Extractum Convolvulæ Jalapæ. Edin. *Extract of Jalap.*

This is ordered to be prepared from the root, in the same manner as the extract of cinchona bark. (*Edin.*)

Extractum Jalapæ. Dub. *Extract of Jalap.*

"Let it be prepared in the same manner as the resinous extract of cascarilla."

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[1] Extrait de Jusquiame (*F.*) Hyoszyamus-extrakt (*G.*) Estratta di Giusquiama nera (*I.*)

[2] *Edin. Medical and Surg. Journal*, vol. ix. p. 6. 11.

[3] Extractum Jalapii, P. L. 1745. Extrait de Jalap (*F.*)

These extracts contain all the active principles of the jalap root. They are, however, apt to gripe during their operation: hence, particularly when given to children, they should be triturated with sugar and almonds, or mucilage, so as to form an emulsion, in which state they operate freely and without griping. The dose to an adult is from grs. x. to ℈j.

EXTRACTUM RADICIS JALAPÆ. Dub. *Extract of Jalap Root.*

This is to be prepared with water alone, after the manner directed for the preparation of the simple extracts. (*Dub.*) It contains chiefly the gummy part of the jalap, very little of the resin being taken up by the water. It is milder in its operation than the root, and may be given to infants in doses of from grs. vi. to grs. xij. triturated with sugar or testaceous powders.

SUCCUS SPISSATUS LACTUCÆ SATIVÆ. Edin. *Inspissated Juice of Garden Lettuce.*[1]

This is to be prepared from the fresh leaves, according to the general directions for preparing inspissated juices.

SUCCUS SPISSATUS LACTUCÆ VIROSÆ. Edin. *Inspissated Juice of the Wild Lettuce.*[2]

To be prepared from the fresh herb, in the same manner as the other inspissated juices.

The extracts of both the above species of lactuca are exhibited as substitutes for opium, in cases in which the intention is rather to allay irritation than to produce the full effect of a narcotic. The dose is grs. vj. gradually increased.

EXTRACTUM OPII. Lond. *Extract of Opium.*[3]

"Take of opium sliced, *half a pound*; water, *three pints*. Pour a small portion of the water upon the opium, and macerate for twelve hours, that it may become soft; then adding gradually the remaining water, rub them together until they be well mixed, and set the mixture apart that the feculencies may subside. Lastly, strain the liquor, and evaporate it to a proper consistence."

EXTRACTUM OPII AQUOSUM. Dub. *Watery Extract of Opium.*

"Take of opium, *two ounces*; boiling water, *a pint*. Rub the opium in the water for ten minutes, and after a little pour off the solution; rub the residuary opium in an equal quantity of boiling water for the same space of time, pouring off also this solution; and repeat the operation a third time. Mix together the decanted solutions, and expose the mixture in a broad open vessel to the air for two days. Lastly, strain it through linen, and by slow evaporation form it into an extract."

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[1] Extrait de Laitue (*F.*)

[2] Extrait de Laitue vireuse (*F.*) Estratto dell' erba della Lactuca (*I.*)

[3] Extrait d'Opium (*F.*) Opiums extrakt (*G.*) Estratto d'Oppio (*I.*)

Water takes up a certain proportion of all the constituents of crude opium, but less of the resinous than of the gummy part; and from the chemical analysis of opium, it appears that the watery solution contains more of the narcotic principle, or morphia, on which depends the remedial quality of opium. In the Dublin preparation the quantity of active matter must necessarily be greater, owing to the employment of boiling water for the second and third triturations. This extract, therefore, differs very little from opium; but as the inspissation cannot always be conducted exactly in the same manner, its strength must consequently vary. From ℔ſs. of crude opium ℥ijſs only of extract are obtained, by following the directions of the London College.

Qualities.—This extract is inodorous, has a bitter taste, and is of a very deep brown colour. It is not altogether soluble in water, but is not precipitated from its solution by alcohol. It, however, affords precipitates with the following substances, which ought not, therefore, to enter into prescriptions with its solution; viz. solutions of astringent vegetables, the alkaline carbonates, corrosive muriate of mercury, sulphate of copper, sulphate of zinc, acetate of lead, and nitrate of silver.

Medical properties and uses.—This extract is supposed to possess the narcotic and anodyne powers of opium, but to produce its effects with less subsequent derangement of the nervous system. It is therefore supposed to be well adapted for the diseases of children and very irritable habits. The dose is from gr. j. to grs. vj. for an adult.

Officinal preparation. *Syrupus Opii.* D.

EXTRACTUM PAPAVERIS. Lond. EXTRACTUM PAPAVERIS SOMNIFERI. Edin. *Extract of Poppies.*[1]

"Take of the capsules of the poppy, freed from the seeds, and bruised, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints; strain the hot liquor, and evaporate it to a proper consistence."

This extract possesses nearly the same medicinal properties as opium, but in a much weaker degree; and is less apt to occasion the nausea, head-ach, and delirium, which opium not unfrequently produces. It is therefore to be preferred for procuring sleep in diseases in which the head is much affected. The dose is from grs. ij. to ℈j. given in the form of pills.

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[1] Extrait de Pavot (*F.*)

EXTRACTUM CORTICIS QUERCUS. Dub. *Extract of Oak Bark.*[1]

This extract is ordered to be prepared in the same manner as the simple extracts. It consists principally of tannin, which is, therefore, not liable to be injured by this form of preparation; but it possesses no peculiar advantages to recommend it to particular notice.

EXTRACTUM RHEI. Lond. *Extract of Rhubarb.*[2]

"Take of rhubarb root bruised, *a pound*; proof spirit, *a pint*; water, *seven pints*. Macerate for four days in a gentle heat; then strain the solution, and set it apart that the feculencies may subside. Pour off the clear liquor, and evaporate it to a proper consistence."

Although the purgative properties of the rhubarb be obtained to a certain degree in this extract, yet its virtues are certainly impaired during the inspissation; and the simple infusion is in every respect a preferable form of preparation. The dose is from grs. x. to ʒſs. given in the form of pills, or dissolved in peppermint water.

EXTRACTUM RUTÆ GRAVEOLENTIS. Edin. EXTRACTUM FOLIORUM RUTÆ. Dub. *Extract of Rue.*

The Edinburgh extract is to be prepared in the same manner as the extract of gentian; the Dublin after the manner of the simple extracts. Prepared by either process, this extract is inodorous, and has a bitter acrid taste. Its medicinal properties are different from those of the plant, the stimulant and narcotic powers of which depend on the volatile oil it contains, which is dissipated during the inspissation of the extract. The dose is from grs. x. to ℈j. in pills.

EXTRACTUM FOLIORUM SABINÆ. Dub. *Extract of Savine.*

To be prepared in the same manner as the simple extracts. It is a simple bitter of little efficacy, for the acrid volatile oil on which the efficacy of savine depends is dissipated by the heat employed during the inspissation. The dose is from grs. x. to ʒſs. in pills.

SUCCUS SPISSATUS SAMBUCI NIGRÆ. Edin. *The inspissated Juice of the Black Elder.*[3]

"Take of the ripe berries of the black elder, *five parts*; purified sugar, *one part*. Boil with a gentle heat to the consistence of thick honey.

EXTRACTUM SARSAPARILLÆ. Lond. *Extract of Sarsaparilla.*

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[1] Estratto della Quercia (*I.*)
[2] Extrait de Rhubarbe (*F.*) Rhabarber-extrakt (*G.*)
[3] Eingedicker Fliedersaft (*G.*)

"Take of sarsaparilla root, sliced, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours, then boil down to four pints; strain the solution while it is hot, and evaporate it to a proper consistence."

This extract has nothing to recommend it to practice. The decoction of the root is preferable in every respect, but neither of them is possessed of much efficacy. The dose is from grs. ix. to ʒj. dissolved in the decoction, or given in the form of pills.

EXTRACTUM TARAXACI. Lond. EXTRACTUM HERBÆ ET RADICIS TARAXACI. Dub. *Extract of Dandelion.*[1]

"Take of fresh dandelion root, bruised, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence."

The medicinal powers of dandelion have been already noticed. (See *Part* ii.) This extract is supposed to contain all the active principles of the plant, and to prove equally efficacious in hepatic obstructions. Dr. Pemberton affirms, that he has seen great advantage result from its administration in doses of ʒſs. in chronic inflammation and incipient scirrhus of the liver, and in chronic derangement of the stomach.[2] The usual dose is from grs. x. to ʒj. united with sulphate of potash.

EXTRACTUM VALERIANÆ. Dub. *Extract of Valerian.*[3]

"Take of valerian root in coarse powder, *six ounces*; boiling water, *six pints*. Mix and digest for twenty-four hours with a moderate heat in a covered vessel; then express the liquor, and reduce it by evaporation to a proper consistence."

The odour of the plant is almost entirely dissipated in preparing this extract; and if the efficacy of the remedy be connected with that quality, which is extremely probable, it must be much inferior to the infusion, or tincture. The usual dose is from grs. x. to ℈j. given in the form of pills, or dissolved in some distilled water.

MISTURÆ.

MIXTURES.

THE term Mixture in pharmaceutical language denotes a mingled compound, in which different ingredients are held suspended in a fluid medium by means of mucilaginous or saccharine matter. The London College has placed under this title, also, those medicines which consist of the fixed oil of seeds diffused through water by means of the mucilage, fecula, or saccharine matter contained in the seeds, and which have hitherto been denominated *Emulsions*. Both these kinds of preparations should always be extemporaneous; and in prescribing them attention is required not to bring together incompatible substances, nor to order in mixtures insoluble matters of a specific gravity too great to be suspended in the fluid vehicle by the ordinary means.

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[1] Lowenzahn-extrakt (*G.*) Estratto di Tarassaco (*I.*)

[2] *On Diseases of the Abdominal Viscera*, p. 43.

[3] Baldrian-extrakt (*G.*)

MISTURA AMMONIACI. Lond. *Mixture of Ammoniac.*

"Take of ammoniac, *two drachms*; water, *half a pint*. Triturate the ammoniac, gradually adding the water until they be thoroughly mixed."

LAC AMMONIACI. Dub. *Milk of Ammoniac.*

"Take of gum ammoniac, *a drachm*; pennyroyal water, *eight fluid ounces*. Triturate the gum, gradually adding the pennyroyal water, until the mixture acquire the appearance of milk, which is to be strained through linen."

The resinous part of the ammoniac is suspended in the water by means of the gummy part; but after a little time the greater portion of the resin subsides. It is coagulated by distilled vinegar, the oxymels, ether, spirit of nitric ether, supertartrate of potash, and oxymuriate of mercury, which are therefore incompatible in prescriptions with mixture of ammoniac. It is advantageously employed as an expectorant in doses of from f℥ſs. to f℥j. combined with an equal quantity of almond mixture.

MISTURA AMYGDALARUM. Lond. *Almond Mixture.*[1]

"Take of almond confection, *two ounces*; distilled water, *a pint*. Add the water gradually to the almond confection whilst triturating, and then strain."

EMULSIO AMYGDALI COMMUNIS. Edin. *Almond Emulsion.*

"Take of sweet almonds, *an ounce*; refined sugar, *half an ounce*; water, *two pounds and a half*. Beat diligently the blanched almonds in a stone mortar, adding the water gradually; then strain."

LAC AMYGDALÆ. Dub. *Almond Milk.*

"Take of sweet almonds, blanched, *an ounce and a half*; purified sugar, *half an ounce*; water, *two pints and a half*. Rub the almonds with the sugar, adding the water gradually; then strain."

EMULSIO ACACIÆ ARABICÆ. Edin. *Emulsion of Gum Arabic.*[2]

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[1] Emulsion d'Amandes (*F.*) Mandelmilch (*G.*) Latte di Mandorle (*I.*)

[2] Emulsion de Gomme Arabique (*F.*) Emulsione di Gomma Arabica (*I.*)

"Take of mucilage of gum arabic, *two ounces*; almonds, *an ounce*; refined sugar, *half an ounce*; water, *two pounds and a half*. Blanch the almonds, and then beat them in a stone mortar with the sugar and the mucilage, gradually adding the water; then strain through linen."

EMULSIO ARABICA. Dub. *Arabic Emulsion.*

"Take of gum arabic in powder, *two drachms*; sweet almonds blanched, purified sugar, of each *half an ounce*; decoction of barley, *a pint*. Dissolve the gum in the warm decoction, and when it is almost cold, pour it gradually upon the almonds previously beaten to a paste with the sugar, triturating at the same time so as to form a milky mixture; then strain."

In these preparations the oil of almonds is diffused through the water, and suspended in it by the mucilage and fecula the almonds contain; the gum in the two latter preparations contributing nothing to this effect. The confection ordered by the London College affords an expeditious mode of making the mixture, but does not prevent the necessity of straining. The use of distilled water is an unnecessary refinement.

Qualities.—These emulsions are inodorous, bland, milky fluids. The oil, after some time, rises like a thick cream to the surface; and in forty-eight hours the acetous fermentation commences, and the mixtures become sour. They are decomposed by acids, oxymel, and syrup of squill, spirits, and tinctures, (unless these be in small quantity,) tartrate and supertartrate of potash, supersulphate of potash, oxymuriate of mercury, acetate of lead, and spirit of nitric ether, which are therefore incompatible in prescriptions with almond emulsions.

Medical properties and uses.—These mixtures are in common use as diluents and demulcents in inflammatory fevers, strangury, dysury, and other affections of the urinary organs; but they are chiefly useful as pleasant vehicles for the exhibition of more active remedies. The dose is from f℥ij. to Oſs. frequently repeated.

MISTURA ASSAFŒTIDÆ. Lond. *Mixture of Assafœtida.*

"Take of assafœtida, *two drachms*; water, *half a pint*. Triturate the assafœtida, gradually adding the water to it, until they be thoroughly mixed."

LAC ASSAFŒTIDÆ. Dub. *Milk of Assafœtida.*

"Take of assafœtida, *a drachm*; pennyroyal water, *eight fluid ounces*. Triturate the assafœtida, gradually adding the water until it forms an emulsion."

Owing to the disagreeable flavour of assafœtida, it is seldom given by the mouth in this form, which is chiefly employed as an enema in flatulent colic, worms, and the convulsions of infants arising from irritations of the bowels during dentition. When given by the mouth, the dose may be from f℥ſs. to f℥jſs. frequently repeated.

MISTURA CAMPHORÆ. Lond. *Mixture of Camphor.*[1]

"Take of camphor, *half a drachm*; rectified spirit, *ten minims*; water, *a pint*. Rub the camphor first with the spirit, then add the water gradually, and strain."

MISTURA CAMPHORATA. Dub. *Camphorated Mixture.*

"Take of camphor, *a scruple*; rectified spirit of wine, *ten drops*; refined sugar, *half an ounce*; water, *a pint*. Rub the camphor first with the spirit, and then with the sugar; add the water during the trituration, and strain the mixture through linen."

A pint of water takes up scarcely more than one half the quantity of camphor ordered by the London College; but it communicates to it both odour and taste in a considerable degree. Solution of pure potash separates the camphor. It is an elegant vehicle for more active remedies in low fevers and nervous affections. The dose is from f℥j. to f℥ij. given every three or four hours.

EMULSIO CAMPHORÆ. Edin. *Camphor Emulsion.*

"Take of camphor, *a scruple*; sweet almonds blanched, refined sugar, each *half an ounce*; water, *a pint and a half.* It is to be made in the same manner as the common almond emulsion."

In this preparation the whole of the camphor is diffused through the mixture; the medicinal powers of which are consequently more considerable than those of the foregoing preparation. It is less apt to excite nausea and uneasiness at the stomach than camphor taken in the solid state, and is given with advantage in typhus and nervous cases in doses of f℥ij. every three or four hours. Its preparation should always be extemporaneous, as the camphor separates and swims on the surface of the mixture after a few days.

MISTURA CORNU USTI. Lond. DECOCTUM CORNU CERVINI. Dub. *Mixture of burnt Hartshorn.*

"Take of burnt hartshorn, *two ounces*; acacia gum, in powder, *an ounce* (*three drachms*, Dub.); water, *three pints*. Boil down to two pints, constantly stirring, and strain."

This is the most unchemical, injudicious, and useless preparation in the pharmacopœias which have admitted it; being a simple diffusion of insoluble phosphate of lime in a thin mucilage.

MISTURA CRETÆ. Lond. Dub. *Mixture of Chalk.*

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[1] Mixture Camphré (*F.*) Kampfermixtur (*G.*) Mistura Canforata (*I.*)

"Take of prepared chalk, *half an ounce*; refined sugar, *three drachms*; acacia gum, in powder, *half an ounce* (*an ounce*, Dub.); water, *a pint*. Mix, by trituration."

POTIO CARBONATIS CALCIS. Edin. *Chalk Potion.*

"Take of prepared carbonate of lime (chalk), *one ounce*; refined sugar, *half an ounce*; mucilage of gum arabic, *two ounces*. Rub them together, and then gradually add of water, *two pounds and a half*; spirit of cinnamon, *two ounces*. Mix them."

These are common and useful forms of giving chalk in acidity of the primæ viæ; and combined with opium or catechu in diarrhœa. The dose is from f℥j. to f℥ij. given every three or four hours; or after every liquid evacuation.

MISTURA FERRI COMPOSITA. Lond.[1] *Compound Mixture of Iron.*

"Take of myrrh, in powder, *a drachm*; subcarbonate of potash, *twenty-five grains*; rose-water, *seven fluid ounces and a half*; sulphate of iron, in powder, *a scruple*; spirit of nutmeg, *half a fluid ounce*; refined sugar, *a drachm*. Rub together the myrrh, the subcarbonate of potash, and the sugar, and while triturating, add first the rose-water and the spirit of nutmeg, and afterwards the sulphate of iron. Put the mixture immediately into a proper glass vessel, and keep it closely stopped."

In this mixture the sulphate of iron is decomposed by the subcarbonate of potash forming, by the change of constituents which takes place, sulphate of potash and subcarbonate of iron; the former of which is dissolved, while the latter is diffused through the mixture, and kept suspended by the myrrh, which forms a saponaceous compound with the excess of alkali. The iron is in the state of a suboxide; and as it rapidly attracts oxygen in this state, and is converted into the red oxide, it is necessary to keep the mixture very well excluded from the air.

Medical properties and uses.—This mixture, which is nearly the same as the celebrated antihectic mixture of Dr. Griffith, is an useful tonic, in all cases in which preparations of iron are indicated, particularly in hysteria and chlorosis, and in phthisis, when no active inflammatory diathesis subsists. The dose is from f℥j. to f℥ij. given two or three times in a day.

MISTURA GUAIACI. Lond. *Mixture of Guaiac.*

"Take of guaiac, *a drachm and a half*; refined sugar, *two drachms*; mucilage of acacia gum, *two fluid drachms*; cinnamon water, *eight fluid ounces.* Rub the guaiac with the sugar, then with the mucilage, and during the trituration add gradually the cinnamon water."

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[1] This name is certainly improper; but it is not easy to invent one which would be descriptive of the compound, and yet be sufficiently concise: *Mistura subcarbonatis ferri cum myrrha* would have been less objectionable.

This is a convenient mode of exhibiting guaiac. It is given in doses of from f℥ſs. to f℥ij. two or three times a day; diluting freely with tepid barley-water or gruel to assist its operation.

MISTURA MOSCHI. Lond. *Mixture of Musk.*[1]

"Take of musk, acacia gum, in powder, refined sugar, of each, *a drachm*; rose-water, *six fluid ounces.* Rub the musk with the sugar, then with the gum, and add gradually the rose-water."

The quantity of gum ordered is scarcely sufficient to retain the musk suspended in the mixture. It is a convenient form of exhibiting the remedy, and may be given to the extent of f℥ij. every three or four hours in spasmodic affections, and the sinking state of typhus. The late Mr. White of Manchester, found this mixture combined with ammonia ʒſs. spirit of lavender fʒj. and spirit of juniper f℥j. of great utility in sloughing phagedenic ulcers of a syphilitic and strumous nature.

ENEMA CATHARTICUM. Dub. *Purging Clyster.*

"Take of manna, *an ounce*; dissolve it in compound decoction of chamomile, *ten fluid ounces*; then add of olive oil, *an ounce*; sulphate of magnesia, *half an ounce.* Mix them."

ENEMA FŒTIDUM. Dub. *Fœtid Clyster.*

"It is to be prepared by adding to the purging clyster *two drachms* of assafœtida."

SPIRITUS.

SPIRITS.

UNDER this title are placed alcohol and spirituous solutions of vegetable matter, chiefly volatile oils, formed by simple mixture, by maceration, and by distillation. They are uniform, transparent, unchanging solutions, containing, in general, a large proportion of volatile oil; and when well prepared, are free from empyreuma. Pure alcohol is more volatile than many of the volatile oils, which do not therefore rise in distillation with it; and, consequently, proof or distilled spirit is employed. As medicinal agents the spirits are stimulant and cordial; but sometimes bad habits are acquired from their continued use. They are employed to cover the taste and flavour of disagreeable medicines; and to make some, which are apt to produce nausea, sit light upon the stomach.

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[1] Mixture avec le musc (*F.*) Mixtura Muschiato (*I.*)

ALCOHOL. Lond. *Alcohol.*[1]

"Take of rectified spirit, *a gallon*; subcarbonate of potash, *three pounds.* Add a pound of the subcarbonate previously heated to 300 degrees to the spirit, and macerate for twenty-four hours, frequently shaking the mixture: then pour off the spirit, and add the remainder of the subcarbonate heated to the same degree: lastly, distil the alcohol from a water-bath, and preserve it in a well closed vessel. The specific gravity of alcohol is to that of distilled water, as ·815 to 1·000."

ALCOHOL. Dub. *Alcohol.*

"Take of rectified spirit of wine, *a gallon*; pearl-ashes dried, at a heat of 300°, and still hot, *a pound*; caustic kali, in powder, *an ounce*; muriate of lime, dried, *half a pound.* Mix the spirit and the kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days in a closed vessel, frequently shaking it; then pour off the spirit; mix with it the muriate of lime; and, lastly, distil with a moderate heat, until the residue begins to thicken. The specific gravity of this spirit is to that of distilled water, as ·815 to 1·000.

"The muriate of lime may be conveniently obtained from the residue of the distillation of water of ammonia."

Rectified spirit, of the specific gravity of 835, contains about fifteen per cent. of water; and to free it from this is the intention of the above processes. The affinity of the alkali and the muriate of lime for water is much greater than that of the spirit; it is therefore attracted by these substances, and prevented from rising with the spirit during the distillation, by which means the alcohol comes over in a very highly concentrated state. The process of the Dublin College is to be preferred, muriate of lime being a much more powerful agent for separating the water than subcarbonate of potash. By its means, Dr. Black obtained alcohol of the specific gravity of 800°; and Richter procured it so low as 0·792, in the temperature of 68° Fahrenheit[2], at which degree of concentration it may be regarded almost as pure alcohol, or alcohol perfectly free from water. The alcohol of the pharmacopœias, therefore, is not free from water, but it is sufficiently concentrated for all the purposes of pharmacy. Alcohol chemically combines with water: the bulk of the resulting mixture is less than the mean of the two liquids before admixture; and much caloric is evolved. It is highly inflammable; and during its combustion water and carbonic acid are formed, the quantity of the water exceeding that of the alcohol consumed. Alcohol boils at 176°, and as its boiling point is higher the more water it contains, its strength may be known by the degree at which it boils; allowing for the atmospheric pressure under which it is tried. It cannot be frozen by any known degree of cold. As a pharmaceutical agent, alcohol, both in its pure and diluted state, is of the utmost importance.

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[1] Alcohol (*F.*) Höchst rektifizirter Weingiest (*G.*) Alcoole (*I.*)

[2] Crell's *Annals*, 1796, ii. 211.

THE following Table drawn up by Lowitz, with an additional column by Dr. Thomson, shows the Specific Gravity of different Mixtures of pure Alcohol of a specific gravity ·791, and Distilled Water, at the temperatures of 60° and 68° of Fahrenheit.

100 parts by weight.		Sp. Gravity		100 parts by weight.		Sp. Gravity		100 parts by weight.		Sp. Gravity	
Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°
100	—	791	796	66	34	877	880	32	68	952	955
99	1	794	798	65	35	880	883	31	69	954	957
98	2	797	801	64	36	882	886	30	70	956	958
97	3	800	804	63	37	885	889	29	71	957	960
96	4	803	807	62	38	887	891	28	72	959	962
95	5	805	809	61	39	889	893	27	73	961	963
94	6	808	812	60	40	892	896	26	74	963	965
93	7	811	*815	59	41	894	898	25	75	965	967
92	8	813	817	58	42	896	900	24	76	966	968
91	9	816	820	57	43	899	903	23	77	968	970
90	10	818	822	56	44	901	904	22	78	970	972
89	11	821	825	55	45	903	906	21	79	971	973
88	12	823	827	54	46	905	908	20	80	973	974
87	13	826	830	53	47	907	910	19	81	974	975
86	14	828	832	52	48	909	912	18	82	976	
85	15	831	†835	51	49	912	915	17	83	977	
84	16	834	838	50	50	914	917	16	84	978	
83	17	836	‡840	49	51	917	920	15	85	980	
82	18	839	843	48	52	919	922	14	86	981	
81	19	842	846	47	53	921	924	13	87	983	
80	20	844	848	46	54	923	926	12	88	985	
79	21	847	851	45	55	925	928	11	89	986	
78	22	849	853	44	56	927	§930	10	90	987	
77	23	851	855	43	57	930	933	9	91	988	
76	24	853	857	42	58	932	‖935	8	92	989	
75	25	856	860	41	59	934	937	7	93	991	
74	26	859	863	40	60	936	939	6	94	992	
73	27	861	865	39	61	938	941	5	95	994	
72	28	863	867	38	62	940	943	4	96	995	
71	29	866	870	37	63	942	945	3	97	997	
70	30	868	871	36	64	944	947	2	98	998	
69	31	870	874	35	65	946	949	1	99	999	
68	32	872	875	34	66	948	951	—	100	1000	
67	33	875	879	33	67	950	953				

* Alcohol of the Lond. and the Dub. Pharm. † Ditto, (*Edin.*) rectified spirit, (*Lond.*) ‡ Rectified spirit, (*Dub.*) § Proof spirit, (*Lond. Dub.*) ‖ Ditto, (*Edin.*)

TABLE, extracted from the Tables of Mr. Gilpin, showing the Real Specific Gravity of different Mixtures of Spirit and Water at every 5° of temperature from 50° to 70°.[1] The standard spirit employed was of the specific gravity 0·825; or contained 89 pure alcohol, and 11 water, in 100 parts.

Proportions by weight of		REAL SPECIFIC GRAVITY				
Spirit.	Water	at 50°.	at 55°.	at 60°.	at 65°.	at 70°.
100	—	·82977	·82736	·82500	·82262	·82023
100	5	·84076	·83834	*·83599	·83362	·83124
100	10	·85042	·84802	·84568	·84334	·84092
100	15	·85902	·85664	·85430	·85193	·84951
100	20	·86676	·86441	·86208	·85975	·85736
100	25	·87384	·87150	·86918	·86680	·86415
100	30	·88030	·87796	·87569	·87337	·87105
100	35	·88626	·88393	·88169	·87938	·87705
190	40	·89174	·88945	·88720	·88490	·88254
100	45	·89684	·89458	·89232	·89006	·88773
100	50	·90160	·89933	·89707	·89479	·89252
100	55	·90596	·90367	·90144	·89920	·89695
100	60	·90997	·90768	·90549	·90328	·90104
100	65	·91370	·91144	·90927	·90707	·90484
100	70	·91723	·91502	·91227	·91066	·90847
100	75	·92051	·91837	·91622	·91400	·91181
100	80	·92358	·92145	·91933	·91715	·91493
100	85	·92647	·92436	·92215	·92010	·91793
100	90	·92919	·92707	·92499	·92283	·92069
100	95	·93177	·92960	·92758	·92546	·92333
100	100	·93419	·93208	†·93002	·92794	·92580
100	95	·93658	·93462	·83247	·93040	·92828
109	90	·93897	·93696	‡·93493	·93285	·93076
100	85	·94149	·93948	·93749	·93546	·93337
100	80	·94414	·94213	·94018	·93822	·93616
105	75	·94683	·94486	·94296	·94099	·93898
100	70	·94958	·94767	·94579	·94388	·94193
100	65	·95243	·95087	·94876	·94689	·94500
100	60	·95534	·95467	·95181	·95000	·94813
100	55	·95831	·95662	·95493	·95318	·95139
100	50	·96126	·95966	·95804	·95635	·95469
100	45	·96420	·96262	·96122	·95962	·95802
100	40	·96708	·96595	·96437	·96288	·96143
100	35	·96995	·96277	·96752	·96620	·96484
100	30	·97284	·97181	·97074	·96959	·96836
100	25	·97589	·97800	·97410	·87309	·97203
100	20	·97920	·97887	·97771	·97688	·97596
100	15	·98293	·98289	·98176	·98106	·98028
100	10	·98745	·98702	·98654	·98594	·98527
100	5	·99316	·99284	·99244	·99194	·99134

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[1] *Phil. Trans.* for 1794, p. 320—370.

* Alcohol, (*Edin.*) Rectified spirit, (*Lond.*)

† Proof spirit, (*Lond. Dub.*)

‡ Proof spirit, (*Edin.*)

SPIR'ITUS AMMO'NIÆ.[1] Lond. *Spirit of Ammonia.*

"Take of rectified spirit, *three pints;* muriate of ammonia, *four ounces;* subcarbonate of potash, *six ounces.* Mix, and, by a gentle heat, distil over a pint and a half of spirit of ammonia into a receiver which is kept cold."

ALCOHOL AMMONIATUM. Edin. *Ammoniated Alcohol.*

"Take of alcohol (835), *thirty-two ounces;* lime, recently burnt, *twelve ounces;* muriate of ammonia, *eight ounces;* water, *six ounces.* From these ammoniated alcohol is prepared exactly in the same manner as water of ammonia."

SPIRITUS AMMONIÆ. Dub. *Spirit of Ammonia.*

"Take of proof spirit, *three pints;* muriate of ammonia, *four ounces;* pot-ashes, *six ounces.* Mix them, and distil with a moderate heat two pints."

In these processes, the muriate of ammonia is decomposed by the lime, which attracts the muriatic acid, while the ammonia is extricated in a pure state, volatilized, and readily combines with the alcohol. Muriate of lime remains in the retort. The present formula of the London and of the Dublin Colleges is the same. It does not yield a solution of pure ammonia in alcohol, but a mixed solution of a small portion of ammonia in spirit, and a portion of subcarbonate of ammonia in water; a portion of subcarbonate of ammonia also sublimes, and remains undissolved in the distilled product.

This spirit properly prepared has the pungent odour and acrid taste of ammonia, with which it coincides in its medicinal properties. It is chiefly used for pharmaceutical purposes.

Officinal preparations. *Spiritus Ammoniæ compositus.* L. E. D. *Spiritus Ammoniæ fœtidus.* L. E. D. *Tinctura Castorei composita.* E. *Tinctura Guaiaci composita.* E. *Tinctura Opii ammoniata.* E.

SPIRITUS AMMONIÆ AROMATICUS.[2] Lond. *Aromatic Spirit of Ammonia.*

"Take of cinnamon bark bruised, cloves bruised, of each, *two drachms;* lemon-peel, *four ounces;* subcarbonate of potash, *half a pound;* muriate of ammonia, *five ounces;* rectified spirit, *four pints;* water, *a gallon.* Mix, and distil over six pints."

TINCTURA AMMONIATUM AROMATICUM. Edin. *Aromatic ammoniated Tincture.*

"Take of ammoniated alcohol, *eight ounces;* volatile oil of rosemary, *a drachm and a half;* volatile oil of lemons, *a drachm.* Mix them so as to dissolve the oils."

SPIRITUS AMMONIÆ AROMATICUS. Dub. *Aromatic Spirit of Ammonia.*

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[1] Spiritus Salis ammoniaci dulcis, P. L. 1745. Alcohol Ammoniacal (*F.*) Gristiger Ammonium liquor (*G.*) Alcoole Ammoniato (*I.*)

[2] Spiritus Ammoniæ compositus, P. L. 1787.

"Take of spirit of ammonia, *two pints;* essential oil of lemons, *two drachms*; nutmegs, bruised, *half an ounce.* Digest in a covered vessel for three days, frequently shaking the vessel; then distil *a pound and a half.*"

For these latter preparations it is necessary that the oils be pure; for if they contain fixed oil, as is often the case with the volatile oils imported into this country, the mixture is rendered turbid and coloured. It is turbid also with pure oils if the spirit of ammonia contain any carbonate of ammonia, as must be the case in the Dublin preparation; in which case it is necessary to distil the mixtures.

Medical properties and uses.—This spirit is an useful stimulant in languors, and flatulent colic; and the oils render it more grateful to the stomach than the simple spirit of ammonia. The dose is from f℥ſs. to fʒj. in any convenient vehicle.

Officinal preparations. *Tinctura Guaiaci ammoniata.* L. D. *Tinctura Valerianæ ammoniata.* L. D.

SPIR′ITUS AMMO′NIÆ FŒT′IDUS.[1] Lond. Dub. *Fœtid Spirit of Ammonia.*

"Take of spirit of ammonia, *two pints*; assafœtida, *two ounces,* (*one ounce and a half,* Dub.) Macerate for twelve hours (for three days, in a covered vessel, with frequent agitation, *Dub.*); then by a gentle fire distil one pint and a half into a cold receiver."

TINCTURA ASSAFŒTIDÆ AMMONIATA. Edin. *Ammoniated Tincture of Ammonia.*

"Take of ammoniated alcohol, *eight ounces*; assafœtida, *half an ounce.* Digest them in a close vessel for twelve hours; then distil eight ounces by the heat of boiling water."

In these processes the fœtid volatile oil of the gum resin is dissolved in the spirit of ammonia, and its odour and flavour communicated to it; but very little else is taken up. Its medicinal properties are not different from those of the preceding spirit; and its dose is the same. It acquires colour from age.

SPIR′ITUS AMMO′NIÆ SUCCINA′TUS. Lond. *Succinated Spirit of Ammonia.*[2]

"Take of mastich, *three drachms*; alcohol, *nine fluid drachms*; oil of lavender, *fourteen minims*; oil of amber, *four minims*; solution of ammonia, *ten fluid ounces.* Macerate the mastich in the alcohol, that it may be dissolved, and pour off the clear tincture; then add the other ingredients, and mix them by agitation."

The preparation of this name in the Pharmacopœia of 1787 did not preserve the milky appearance characteristic of the eau-de-luce, for which it was intended to be a substitute: and therefore the present formula is given as furnishing a compound capable of preserving its milkiness for a very considerable time. It is employed as a stimulant and antispasmodic in the same cases as the oil of amber; and has been successfully used in India against the bite of the rattlesnake. The dose is from ♏x. to fʒſs. given in any convenient vehicle.

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[1] Spiritus volatilis fœtidus, P. L. 1745.

[2] Eau de Luce (*F.*) Ammoniaca Succinata (*I.*)

SPIRITUS ANISI. Lond. *Spirit of Aniseed.*[1]

"Take of aniseeds bruised, *half a pound*; proof spirit, *a gallon*; water, *a sufficient quantity to prevent empyreuma.* Macerate for twenty-four hours; then distil by a gentle fire."

SPIRITUS ANISI COMPOSITUS. Dub. *Compound Spirit of Aniseed.*

"Take of aniseeds bruised, angelica seeds bruised, of each, *half a pound*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Distil one gallon."

These are pleasant carminatives in flatulent colic, and similar affections. The dose is from fʒſs. to fʒiv. in water.

SPIRITUS ARMORACIÆ COMPOSITUS. Lond. *Compound Spirit of Horse-Radish.*

"Take of fresh horse-radish, sliced, orange-peel dried, of each, *a pound*; nutmegs bruised, *half an ounce*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; and distil a gallon by a gentle fire."

SPIRITUS RAPHANI COMPOSITUS. Dub. *Compound Spirit of Horse-Radish.*

"Take of fresh horse-radish dried, peel of Seville oranges, of each, *two pounds*; fresh garden scurvy-grass, *four pounds*; nutmegs bruised, *an ounce*; proof spirit, *two gallons*; water, *sufficient to prevent empyreuma.* Distil two gallons."

These spirits were formerly used as antiscorbutics, but they possess little value as such; and are now chiefly used in dropsies attended with much debility. The dose is from fʒj. to fʒiv. combined with infusion of foxglove or of juniper berries.

SPIRITUS CAMPHORÆ. Lond. SPIRITUS CAMPHORATUS. Dub. *Spirit of Camphor.*[2]

"Take of camphor, *four ounces*; rectified spirit, *two pints.* Mix, that the camphor may be dissolved."

TINCTURA CAMPHORÆ. Edin. *Tincture of Camphor.*

"Take of camphor, *an ounce*; alcohol (sp. grav. 835), *a pound.* Mix, that the camphor may be dissolved. It may also be made with double or triple the quantity of camphor."

The strength of the spirit renders this preparation unfit to be given internally; and the addition of water, with the view of diluting it, separates the camphor. It is an useful stimulant and discutient application to chilblains, and in chronic rheumatism, paralytic numbness, and gangrene.

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[1] Alcohol d'Anis (*F.*) Alcoole Anisato (*I.*)

[2] Alcohol Camphré (*F.*) Kampfer Spiritus (*G.*) Alcoole Canforato (*I.*)

SPIRITUS CARUI. Lond. Dub. *Spirit of Carraway.*[1]

"Take of carraway seeds bruised, *a pound and a half*, (*half a pound*, Dub.); proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours, then distil a gallon by a gentle fire."

SPIRITUS CARI CARUI. Edin. *Spirit of Carraway.*

"Take of carraway seeds bruised, *half a pound*; proof spirit, *nine pounds.* Macerate for two days in a close vessel; then add a sufficient quantity of water to prevent empyreuma, and distil nine pounds."

An useful carminative, and adjunct to griping purgatives.

SPIRITUS CINNAMOMI. Lond. Dub. *Spirit of Cinnamon.*

"Take of cinnamon bark bruised, *a pound*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon by a gentle fire."

SPIRITUS LAURI CINNAMOMI. Edin. *Spirit of Cinnamon.*

"To be prepared with a pound of cinnamon bark, in the same manner as the spirit of carraway."

This spirit is an agreeable cordial in diseases attended with much languor and debility. The dose is from f℥j. to f℥iv. in any convenient vehicle.

Officinal preparation. *Infusum Digitalis.* L.

SPIRITUS JUNIPERI COMPOSITUS. Lond. Dub. Edin. *Compound Spirit of Juniper.*

"Take of juniper berries bruised, *a pound*; carraway seeds bruised, fennel seeds bruised, of each, *an ounce and a half*; proof spirit, *a gallon* (*nine pounds*, Edin.); water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours (two days, *Edin. Dub.*); then distil a gallon (nine pounds, *Edin.*) by a gentle heat."

This spirit is a grateful and useful addition to infusions of foxglove, and other diuretics, in dropsy."

SPIRITUS LAVANDULÆ. Lond. *Spirit of Lavender.*

"Take of fresh lavender flowers, *two pounds*; rectified spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon by a gentle heat."

Dublin.

"Take of fresh flowers of lavender, *a pound and a half*;

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[1] Alcoole con Carvi (*I.*)

proof spirit, *a gallon*; water, *sufficient to prevent empreuma.* Distil five pints by a moderate fire."

SPIRITUS LAVANDULÆ SPICÆ. Edin. *Spirit of Lavender.*

"Take of fresh flowers of lavender, *two pounds*; alcohol, *eight pounds.* Distil, with the heat of a water-bath, seven pounds."

The oil of lavender is sufficiently volatile to be brought over with rectified spirit, which is also required to extract all the oil from the flowers: for this reason the Dublin process produces a spirit less highly impregnated with the oil. Spirit of lavender is chiefly used as a perfume, and in pharmacy to prepare the following articles.

Officinal preparations. *Spiritus Lavandulæ compositus.* L. E. D. *Linimentum Camphoræ compositum.* L.

SPIRITUS LAVANDULÆ COMPOSITUS. Lond. Dub. *Compound Spirit of Lavender.*[1]

"Take of spirit of lavender, *three pints*; spirit of rosemary, *a pint*; cinnamon bark bruised, nutmegs bruised, of each, *half an ounce*; (cloves, *two drachms*, Dub.); red saunders-wood, chipped, *an ounce.* Macerate for fourteen days, (ten days, *Dub.*) and strain."

Edinburgh.

"Take of spirit of lavender, *three pounds*; spirit of rosemary, *one pound*; cinnamon bark bruised, *an ounce*; nutmegs bruised, *two drachms*; red saunders-wood rasped, *three drachms.* Macerate seven days, and strain."

The addition of these aromatics to the spirit of lavender renders it a very grateful cordial and stimulant; very useful in languors and faintings, and as an adjunct to tonic and stomachic infusions. Its dose is from ♏xxx. to f℥ij. either dropped on a piece of sugar, or given in water, in camphor mixture, or any other convenient vehicle.

SPIRITUS MENTHÆ PIPERITÆ. Lond. Edin. *Spirit of Peppermint.*[2]

"Take of peppermint dried, *a pound and a half*; proof spirit, *a gallon* (*nine pounds,* Edin.); water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon (nine pounds, *Edin.*) by a gentle heat."

An useful carminative in nausea and flatulence, and as an adjunct to purgative remedies.

SPIRITUS MENTHÆ VIRIDIS. Lond. *Spirit of Spearmint.*

"Take of spearmint dried, *a pound and a half;* proof spirit, *a gallon*; water, *sufficient to produce empyreuma.* Macerate for twenty-four hours; then distil a gallon by a gentle heat."

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[1] Teinture alcoholique de Lavande (*F.*) Lavendel-spiritus (*G.*)

[2] Teinture alcoholique de Menthe Poivrée (*F.*) Alcoole con Menta piperitide (*I.*)

In the same cases as the former.

SPIRITUS MYRISTICÆ. Lond. SPIRITUS MYRISTICÆ MOSCHATÆ. Edin. SPIRITUS NUCIS MOSCHATÆ. *Spirit of Nutmeg.*

"Take of nutmegs bruised, *two ounces*; proof spirit, *a gallon* (*nine pounds*, Edin.); water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon (nine pounds, *Edin.*) by a gentle heat."

SPIRITUS PIMENTÆ. Lond. SPIRITUS PIMENTO. Dub. *Spirit of Pimenta.*

"Take of pimenta berries bruised, *two ounces* (*three ounces*, Dub.); proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon by a gentle heat."

SPIRITUS MYRTI PIMENTÆ. Edin. *Spirit of Pimenta.*

"It is to be prepared with *half a pound* of bruised pimenta berries, in the same manner as spirit of carraway."

An useful carminative in flatulent colic, atonic gout, and dyspepsia.

SPIRITUS PULEGII. Lond. *Spirit of Pennyroyal.*

"Take of pennyroyal dried, *a pound and a half*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon by a gentle fire."

Similar to spirit of spearmint in its qualities and medicinal properties.

SPIRITUS ROSMARINI. Lond. *Spirit of Rosemary.*[1]

"Take of fresh rosemary tops, *two pounds*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma.* Macerate for twenty-four hours; then distil a gallon in a gentle heat."

SPIRITUS RORISMARINI OFFICINALIS. Edin. *Spirit of Rosemary.*

"Take of fresh rosemary-tops, *two pounds*; alcohol (sp. grav. 835), *eight pounds.* Draw off seven pounds by distillation in a water-bath."

SPIRITUS RORISMARINI. Dub. *Spirit of Rosemary.*

"Take of fresh rosemary-tops, *a pound and a half*; proof spirit, *a gallon.* Distil five pints by a moderate fire."

Oil of rosemary is sufficiently volatile to rise in distillation with rectified spirit, which the Edinburgh College has, therefore, ordered to be used. It is a fragrant perfume, and is chiefly used in the under-mentioned preparations.

Officinal preparations. *Linimentum Saponis compositum.* L. E. D. *Spiritus Lavandulæ compositus.* L. E. D.

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[1] Esprit de Rosmarin (*F.*) Rosmarien-spiritus (*G.*) Alcoole Rosmarinato (*I.*)

TINCTURÆ.

TINCTURES.[1]

THESE are spirituous solutions of such of the proximate principles of vegetables and animals, as are soluble in pure alcohol or in proof spirit. From vegetable matter submitted to its action, alcohol takes up sugar, resin, extractive, tannin, cinchonin, camphor, volatile oils, several acids, and the narcotic principle; proof spirit also takes up the whole of these partially, and is besides the proper menstruum for gum-resins; so that alcohol, either in a concentrated or diluted form, is capable of separating the greater part of the active principles of vegetables from the ligneous inert fibres. The tinctures obtained from animal substances are very few in number, and the principles taken up by the spirit are analogous to those enumerated above, belonging to the vegetable kingdom.

Pure alcohol is required in a very few instances only for the formation of tinctures, proof spirit being adequate for almost every purpose. The dilution of the spirit, however, must be varied according to the known principles of the substance to be submitted to its action: when resin predominates, it must necessarily be more concentrated; when gum-resin or extractive are the most abundant constituents, proof spirit then must be employed. In consequence of the great affinity of water for alcohol, the addition of it to alcoholic tinctures separates the resin, camphor, and volatile oils they contain; but water is generally miscible with tinctures made with proof spirit, without producing any decomposition. Tinctures are not liable to suffer spontaneous decomposition, as is the case with infusions and decoctions; and, independent of the loss which takes place from the evaporation of the spirit and the volatile oils, if the bottles containing tinctures be closely corked, they may be kept for an indefinite length of time, and their virtues remain unimpaired.

Tinctures are prepared by macerating the ingredients in the spirit in a temperature not exceeding 80°, at which degree, by allowing the menstruum to remain on the ingredients for a sufficient length of time, all the principles that can prove useful in the tincture are extracted, and the solvent saturated. The ingredients must be dried and reduced to a coarse powder, and the maceration made in close vessels, and assisted by frequent agitation. When completely made, tinctures should not be allowed to remain upon the ingredients, but be filtered through bibulous paper, and kept in this state in well corked bottles. Parmentier[1] has proposed that one-half only of the spirituous menstruum be added to the ingredients at first, and after digesting for six days this part to be poured off, and the remainder added. In six more the whole is to be strongly expressed, and the two portions of tincture mixed together. By this method he imagines more of the active principles of the ingredients are extracted, and the tinctures obtained of a more uniform strength.

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[1] Arnold de Villa Nova, who was professor of medicine at Montpellier, invented tinctures about the end of the 13th century.

Tinctures are not of very extensive use as remedies, except in cases where stimulants are indicated; the solvent, even in doses of a few fluid drachms, often acting more powerfully on the living system than the principles it holds in solution. In ordinary cases this action, when continued for some time, produces the same deleterious effects as the habitual use of ardent spirits; and often lays the foundation of the pernicious custom of dram-drinking. When the action of a substance is the reverse of stimulant, it cannot with propriety be exhibited in this form, unless the dose be so small that the operation of the spirit cannot be taken into account, as in tincture of foxglove. The chief use of this class of preparations, therefore, is to enable infusions and decoctions, to which they are added, to sit lighter on the stomach, or to add to them some active principle which water is incapable of extracting.

The general rule given in the London Pharmacopœia for the preparation of tinctures is, "to prepare them in closed vessels, and to shake them frequently during the maceration."

TINCTURA ALOES. Lond. *Tincture of Alöes.*[2]

"Take of extract of spiked alöes powdered, *half an ounce*; extract of liquorice, *an ounce and a half*; water, *a pint*; rectified spirit, *four fluid ounces*. Macerate in a sand-bath until the extracts are dissolved; then strain."

Dublin.

"Take of socotorine alöes in powder, *half an ounce*; extract of liquorice dissolved in eight ounces of boiling water, *an ounce and a half*; proof spirit, *eight fluid ounces*. Digest for seven days; then strain."

TINCTURA ALÖES SOCOTORINÆ. Edin. *Tincture of Socotorine Alöes.*

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[1] *Annales de Chimie*, lxii. 40.

[2] Teinture d'Aloés (*F.*) Tintura d'Aloe (*I.*)

"Take of socotorine alöes in powder, *half an ounce*; extract of liquorice, *one ounce and a half*; alcohol, *four ounces*; water, *a pound*. Digest for seven days, with a gentle heat, in a close vessel, which is to be frequently shaken (a circumstance to be attended to in preparing all the tinctures); then pour off the clear tincture."

This may be regarded rather an aqueous solution than a tincture, the quantity of spirit being too small to serve any other purpose than that of preventing decomposition. It may be used in the same cases as the extract of alöes; but, notwithstanding the presence of the liquorice, the bitterness of the alöes is so intense and disagreeable, as to prevent it from being often prescribed. Its dose is from f℥ſs. to f℥jſs.

TINCTURA ALOES ÆTHEREA. Edin. *Ethereal Tincture of Alöes.*

"Take of socotorine alöes, myrrh, of each, in powder, *an ounce and a half*; English saffron cut, *an ounce*; sulphuric ether with alcohol, *a pound*. Digest the myrrh with the ether for four days, in a closed bottle; then add the saffron and the alöes. Digest again for four days, and when the dregs have subsided, pour off the tincture."

The spirit of sulphuric ether is supposed to afford a more grateful tincture than spirit of wine; and in cases attended with spasm, as in hysteria attendant on obstructed menstruation, this solvent may prove serviceable, independent of the matter it holds in solution. It is a warm stomachic purgative, and is advantageously given in dyspeptic affections, jaundice, gout, chlorosis, and other cases in which alöetics are indicated. In doses of fʒj. or fʒij. it acts chiefly as a stomachic; but purges briskly in larger doses.

TINCTURA ALOES COMPOSITA. Lond. Dub. *Compound Tincture of Alöes.*[1]

"Take of extract of spiked alöes powdered, saffron, of each, *three ounces*; tincture of myrrh, *two pints*. Macerate for fourteen days (seven days, *Dub.*), and strain."

TINCTURA ALÖES ET MYRRHÆ. Edin. *Tincture of Alöes and Myrrh.*

"Take of myrrh in powder, *two ounces*; alcohol, *a pound and a half*; water, *half a pound*. Mix the alcohol with the water; then add the myrrh; digest for four days; and lastly, add, of socotorine alöes in powder, *one ounce and a half*; English saffron cut in pieces, *one ounce*. Digest again for three days, and pour off the clear tincture."

This tincture, which differs in little, except the solvent, from the former, may be used in the same cases; and the same dose of it may be given. It is occasionally used as a local stimulant to foul ulcers.

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[1] Alcohol avec l'Aloé et la Myrrhe (*F.*) Alcoole Aloë Mirrato (*I.*)

TINCTURA ASSAFŒTIDÆ. Lond. *Tincture of Assafœtida.*[1]

"Take of assafœtida, *four ounces*; rectified spirit, *two pints.* Macerate for fourteen days, and strain."

Dublin.

"Take of assafœtida, *four ounces*; rectified spirit of wine, *two pints*; water, *eight fluid ounces.* Add the spirit to the assafœtida previously triturated with water; then digest for seven days, and strain."

TINCTURA FERULÆ ASSAFŒTIDÆ. Edin. *Tincture of Assafœtida.*

"Take of assafœtida, *four ounces*; alcohol, *two pounds and a half.* Digest for seven days, and filter through paper."

When this tincture is added to water or aqueous infusions, it renders them of a milky hue, owing to the separation of the resin. It is given in the same cases as crude assafœtida, in doses of f℥j. or more.

Officinal preparation. *Enema fœtidum.* D.

TINCTURA AURANTII. Lond. Dub. *Tincture of Orange-peel.*[2]

"Take of fresh orange-peel, *three ounces*; proof spirit, *two pints.* Macerate for fourteen days, (three days, *Dub.*) and filter."

This tincture is not decomposed by water, and may therefore be added to infusions and decoctions, to which it is an useful adjunct in dyspepsia, besides communicating its agreeable flavour.

TINCTURA BENZOINI COMPOSITA. Lond. TINCTURA BENZÖES COMPOSITA. Dub. *Compound Tincture of Benzoin.*[3]

"Take of benzoin, *three ounces*; storax balsam strained, *two ounces*; balsam of Tolu, *an ounce*; extract of spiked alöes, *half an ounce*; rectified spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA BENZOINI COMPOSITA. Edin. *Compound Tincture of Benzoin.*[4]

"Take of benzoin in powder, *three ounces*; balsam of Peru, *two ounces*; hepatic alöes in powder, *half an ounce*;

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[1] Teinture d'Assafœtide (*F.*) Ascande tinktur (*G.*) Alcoole asfetidato (*I.*)
[2] Pomeranzan schalen tinktur (*G.*)
[3] Teinture de Benzoin composé (*F.*) Zusammengesitzte Benzoe tinktur (*G.*)
[4] Tintura del Commendatore; Alcoole Benzoato composito (*I.*)

alcohol, *two pounds.* Digest for seven days, and filter through paper."

This tincture is a stimulating expectorant, and as such is sometimes prescribed in chronic catarrh and old asthmatic cases; but it is chiefly employed as an external application to wounds and languid ulcers, which it gently stimulates, and shields from the action of the air.[1] It is decomposed by water, and therefore, when given internally, must be triturated with yolk of egg or mucilage, to suspend it in aqueous fluids. Its dose is from f℥ſs. to f℥ij. or more.

TINCTURA BONPLANDIÆ TRIFOLIATA. Edin. *Tincture of Bonplandia, or Angustura.*

"Take of the bark of trifoliate bonplandia bruised, *two ounces;* proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

TINCTURA ANGUSTURÆ. Dub. *Tincture of Angustura.*[2]

"Take of angustura bark in coarse powder, *two ounces;* proof spirit, *two pints.* Digest for seven days; then filter."

This tincture, which contains the active principles of the angustura, is given in doses of f℥j. or f℥ij. in the same cases as the bark. (See *Cusparia*, Part ii.)

TINCTURA CALUMBÆ. Lond. *Tincture of Calumba.*

"Take of calumba root sliced, *two ounces and a half;* proof spirit, *two pints.* Macerate for fourteen days, and filter."

TINCTURA COLOMBÆ. Edin. TINCTURA COLOMBO. Dub. *Tincture of Calumba.*

"Take of colomba root in powder, *two ounces;* proof spirit, *two pounds.* Digest for seven days, and filter through paper."

An useful addition to stomachic infusions and decoctions.

TINCTURA CAMPHORÆ COMPOSITA.[3] Lond. *Compound Tincture of Camphor.*

"Take of camphor, *two scruples;* hard opium, powdered, acid of benzoin, of each, *one drachm;* proof spirit, *two pints.* Macerate for fourteen days, and filter."

TINCTURA OPII CAMPHORATA, sive ELIXIR PAREGORICUM ANGLORUM. Edin. Dub. *Camphorated Tincture of Opium,* or *Paregoric Elixir.*

"Take of camphor, *two scruples;* hard purified opium in powder, benzoic acid, of each, *a drachm;* proof spirit, *two pints.* Digest for seven (ten *Dub.*) days, then filter."

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[1] It is an improved form of Wade's Balsam, or Friar's Balsam.

[2] Teinture d'Angusture (*F.*)

[3] The change of name here imposed, appears to us to be more likely to produce errors than the old name; and it is directly opposed to the principles of nomenclature adopted by the College. Teinture Camphrée d'Opium (*F.*) Opiumstinktur mit Benzoe (*G.*)

Half a fluid ounce of this tincture contains nearly a grain of opium. It has been long known under the titles *Paregoric Elixir* and *Asthmatic Elixir ;* and is an useful anodyne in chronic asthma, hooping-cough, and catarrh after the inflammatory symptoms have abated; in which it contributes to allay the tickling which induces the frequent cough. The dose is from fʒj. to fʒiij. occasionally in the above cases, using after it the inhaler; and fʒiij. in cases where quiet, rather than sleep, is required.

TINCTURA CAPSICI. Lond. *Tincture of Capsicum.*

" Take of capsicum berries, *an ounce ;* proof spirit, *two pints.* Macerate for fourteen days, and filter."

This is a convenient form for exhibiting capsicum in tympanitis, cynanche maligna, the low stage of typhus, and in similar cases. The dose is from fʒſs. to fʒj.; and a mixture of fʒvj. with half a pint of water will answer all the purposes of the capsicum gargle.

TINCTURA CARDAMOMI. Lond. Dub. *Tincture of Cardamoms.*

" Take of cardamom seeds husked and bruised, *three ounces ;* proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA AMOMI REPENTIS. Edin. *Tincture of Cardamoms.*

" Take of lesser cardamom seeds bruised, *four ounces*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

TINCTURA CARDAMOMI COMPOSITA. Lond. Dub. *Compound Tincture of Cardamoms.*

" Take of cardamom seeds, (husked, *Dub.*) carraway seeds, cochineal, of each, in powder, *two drachms*; cinnamon bark bruised, *half an ounce*; raisins stoned, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days, and filter."

The raisins are properly omitted in the Dublin formula. Both the simple and the compound tinctures of cardamoms are agreeable cordials, and form elegant adjuncts to stomachic infusions.

TINCTURA CASCARILLÆ.[1] Lond. Dub. *Tincture of Cascarilla.*

" Take of cascarilla bark powdered, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA CROTONIS ELEUTHERIÆ. Edin. *Tincture of Croton Eleutheria*, or *Cascarilla.*

" Take of croton eleutheria bruised, *four ounces*; proof spirit,

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[1] Cascarillentinktur (*G.*)

two pounds and a half. Digest for seven days, and filter through paper."

This tincture may be regarded as superfluous, as it is scarcely ever ordered.

TINCTURA CASTOREI.[1] Lond. TINCTURA CASTOREI (ROSSICI, CANADENSIS.) Dub. *Tincture of Castor.*

"Take of castor powdered, *two ounces*; rectified spirit, (proof spirit, *Dub.*) *two pints.* Macerate for seven days, and filter."

Edinburgh.

"Take of castor powdered, *an ounce and a half*; alcohol, *a pound.* Macerate for seven days, and filter through paper."

Rectified spirit is the preferable solvent for the active parts of castor, which are resin and a volatile oil; and it also affords a more grateful tincture than that made with proof spirit. The tincture is supposed to possess the medical properties of the castor, and is used in similar cases. The dose is from ♏ xx. to fʒij.

The Dublin College orders a "*tincture of Russian castor,*" and a "*tincture of Canadian castor,*" which is an unnecessary refinement. The Russian castor is the best, and should always be preferred when it can be obtained.

TINCTU'RA CASTOREI COMPOSITA. Edin. *Compound Tincture of Castor.*

"Take of Russian castor powdered, *an ounce*; assafœtida, *half an ounce*; ammoniated alcohol, *one pound.* Digest for seven days, and filter through paper."

This is a more active preparation than the former, and is advantageously given in hysteria, cramp of the stomach, and flatulent colic, to the extent of fʒij. for a dose.

TINCTU'RA CAT'ECHU.[2] Lond. Dub. *Tincture of Catechu.*

"Take of extract of catechu, *three ounces*; cinnamon bark bruised, *two ounces*; proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA CATECHU ACACIÆ. Edin. *Tincture of Catechu.*

"Take of extract of catechu in powder, *three ounces*; cinnamon bark bruised, *two ounces*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

Proof spirit dissolves all the soluble parts of catechu except the mucilage, which in ℥iij of Bengal catechu amounts to 94 grains; besides which 72 grains of impurities remain undissolved. The tincture is a solution of tannin, extractive matter, and the volatile oil of cinnamon. It is a grateful warm astringent, useful in all cases in which astringents are indicated. The dose is from fʒj. to fʒiij. taken in water or wine, or the cretaceous mixture of the pharmacopœias.

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[1] Teinture de Castor (*F.*) Castoreumstinktur (*G.*) Tintura di Castoro (*I.*)

[2] Tinctura Japonica, P.L. 1745. Teinture de Cachou (*F.*) Katechutinktur (*G.*)

TINCTURA CINCHONÆ.[1] Lond. *Tincture of Cinchona.*

" Take of lance-leaved cinchona bark in powder, *seven ounces*; proof spirit, *two pints.* Macerate for fourteen days, and filter."

TINCTURA CINCHONÆ. Edin. TINCTURA LANCIFOLIÆ CINCHONÆ. Dub. *Tincture of Lance-leaved Cinchona.*

" Take of cinchona bark in powder, *four ounces;* proof spirit, *two pounds and a half,* (*two pints*, Dub.) Digest for seven days, and filter through paper."

Although this tincture contains the active principles of cinchona bark in considerable quantity, yet, from the nature of the vehicle, it cannot be given in sufficiently large doses to produce the beneficial effects of the bark in substance; it is therefore used chiefly as an adjunct to the infusion or decoction. The dose is from fʒj. to fʒiv.

TINCTU'RA CINCHO'NÆ AMMONIATA. Lond. *Ammoniated Tincture of Bark.*

" Take of lance-leaved cinchona bark powdered, *four ounces;* aromatic spirit of ammonia, *two pints.* Macerate for ten days, and filter."

This is the formula of 1787, which was rejected without any proper reason in 1809. It is extremely useful in dyspeptic complaints attended with much acidity.

TINCTU'RA CINCHO'NÆ COMPOS'ITA.[2] Lond. Edin. Dub. *Compound Tincture of Cinchona.*

" Take of lance-leaved cinchona bark powdered, *two ounces;* dried orange-peel, *one ounce and a half;* (*half an ounce*, Dub.) Virginian snake-root bruised, *three drachms*; saffron, *a drachm*; cochineal in powder, *two scruples*; proof spirit, *twenty fluid ounces.* Macerate for fourteen (*seven* Edin.) days, and filter."

This tincture is more grateful than the former; and although it contains less cinchona, yet the addition of the other ingredients renders it more useful both as a stomachic and a febrifuge. It is the same as the celebrated tincture of Huxham[3], who generally gave it in intermittents and low nervous fevers, in diluted wine or any proper vehicle, with ten or fifteen drops of elixir of vitriol, (aromatic sulphuric acid, *Edin.*) The dose is from fʒj. to fʒiij. or more in intermittents.

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[1] Tinctura corticis Peruvianæ simplex, P. L. 1745. Teinture de Quinquina (*F.*) Chinatinktur (*G.*) Tintura di China (*I.*)

[2] Zusammengesetzte Chinatinktur (*G.*)

[3] *Essay on Fever*, 122.

TINCTU'RA CINNAMO'MI.[1] Lond. Dub. TINCTURA LAURI CINNAMOMI. Edin. *Tincture of Cinnamon.*

"Take of cinnamon bark bruised, *three ounces*; (*three ounces and a half*, Dub.) proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

This tincture contains the active principles of the bark, and is an elegant and useful adjunct to the chalk mixture and astringent infusions. The dose is from fʒj. to fʒiij.

TINCTU'RA CINNAMO'MI COMPOS'ITA.[2] Lond. Dub. *Compound Tincture of Cinnamon.*

"Take of cinnamon bark bruised, *six drachms*; cardamom seeds bruised, *three drachms*; long pepper powdered, ginger-root sliced, of each, *two drachms*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA CINNAMOMI COMPOSITA. Edin. *Compound Tincture of Cinnamon.*

"Take of cinnamon bark bruised, lesser cardamom seeds bruised, of each *one ounce*; long pepper in powder, *two drachms*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

This is a much warmer aromatic than the simple tincture; and is frequently advantageously used in flatulencies, atonic gout, languors, and debility, in doses of fʒj. or fʒij. properly diluted.

Officinal preparation. *Æther sulphuricus cum Alcohole aromaticus.* E.

TINCTURA CONII MACULATI. Edin. *Tincture of Hemlock.*

"Take of dried leaves of hemlock, *two ounces*; cardamom seeds, bruised, *half an ounce*; proof spirit, *sixteen ounces*. Digest for seven days, and filter through paper."

This is an elegant form of administering conium; and admits of its being added to mixtures. It possesses all the active properties of the plant.

TINCTURA CROCI SATIVI. Edin. TINCTURA CROCI. Dub. *Tincture of Saffron.*[3]

"Take of English saffron cut in shreds, *one ounce*; proof spirit, *fifteen ounces*, (*a pint*, Dub.) Digest for seven days, and filter through paper."

This tincture contains almost pure extractive, and is supposed to be stimulant and diaphoretic, but its chief value perhaps arises from its colour.

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[1] Aqua Cinnamomi fortis, P.L. 1720. Teinture de Canelle (*F.*) Zimmttinktur (*G.*) Tintura di Cinnamomo (*I.*)

[2] Tinctura aromatica, P.L. 1745.

[3] Teinture de Saffron (*F.*)

TINCTU'RA DIGITA'LIS.[1] Lond. *Tincture of Foxglove.*

"Take of foxglove leaves dried, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

Dublin.

"Take of foxglove leaves (the larger ones being rejected) dried and reduced to coarse powder, *two ounces*; proof spirit, *a pint*. Digest for seven days, and filter."

TINCTURA DIGITALIS PURPUREÆ. Edin. *Tincture of Foxglove.*

"Take of foxglove leaves dried, *one ounce*; proof spirit, *eight ounces*. Digest for seven days, and filter through paper."

This is a convenient form for exhibiting foxglove. It contains all the virtues of the plant, and has the advantage of preserving them unimpaired for any length of time. The dose should be ♏ x. at first, and gradually increased, the same cautions being necessary as in the exhibition of the plant in substance.

TINCTURA GALBANI. Dub. *Tincture of Galbanum.*

"Take of galbanum cut into small pieces, *two ounces*; proof spirit, *two pints*. Digest for seven days, then filter."

It is used in the same cases as tincture of assafœtida; but, if less nauseous, it is also less powerful.

TINCTURA GALLARUM. Edin. Dub. *Tincture of Galls.*

"Take of galls in powder, *two ounces* (*four ounces*, Dub.); proof spirit, *sixteen ounces*, (*two pints*, Dub.) Macerate for seven days, then filter through paper."

Proof spirit dissolves tannin; consequently this tincture contains all the astringency of the galls, and may be employed in the same cases. The dose is from fʒj. to fʒiij.

TINCTU'RA GENTIA'NÆ COMPOS'ITA.[2] Lond. Dub. *Compound Tincture of Gentian.*

"Take of gentian root cut, *two ounces*; orange-peel dried, *an ounce*; cardamom seeds bruised, *half an ounce*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA GENTIANÆ COMPOSITA. Edin. *Compound Tincture of Gentian*, commonly called *Stomachic Tincture.*

"Take of yellow gentian root sliced and bruised, *two ounces*; orange-peel dried and bruised, *one ounce*; canella alba bruised, *half an ounce*; cochineal in powder, *half a drachm*; proof spirit,

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[1] Teinture de Digitale (*F.*) Fingerhautinktur (*G.*) Tintura di Digitale porporrina (*I.*)

[2] Tintura amara, P. L. 1745. Teinture de Gentiane composê (*F.*) Enziantinktur (*G.*) Tintura di Genziana (*I.*)

two pints and a half. Digest for seven days, and filter through paper.

This is an elegant stomachic bitter and cordial; but in dyspepsia, in which it is more particularly indicated, the infusion is preferable.

TINCTURA GUAI'ACI. Lond. Dub. *Tincture of Guaiac.*[1]

"Take of guaiac powdered, *half a pound* (*four ounces*, Dub.); proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

Tinctura Guaiaci officinalis. Edin. *Tincture of Guaiac.*

"Take of guaiac, in powder, *six ounces*; alcohol, *two pounds and a half.* Digest for seven days, and filter through paper."

The difference in the proportion of the guaiac in these formulæ is much to be regretted. It is separated from the alcohol by the addition of water; and therefore when this tincture is to be given in the form of draught, it must be triturated with yolk of egg, or with mucilage, to enable it to combine with water. The dose is from fʒj. to fʒiij. in any convenient vehicle.

TINCTU'RA GUAI'ACI AMMONIATA.[2] Lond. Dub. Edin. *Ammoniated Tincture of Guaiacum.*

"Take of guaiac, in powder, *four ounces*; aromatic spirit of ammonia, *one pint and a half.* Macerate for fourteen days, (seven days, *Edin. Dub.*) and filter."

As the ammonia coincides with the operation of guaiac more than spirit, this tincture is more efficacious as a stimulating sudorific than the former preparation. Water decomposes it, separating the guaiac in dark curdy flakes. The dose is from fʒj. to fʒij. triturated with any mucous or viscid matter.

TINCTU'RA HELEB'ORI NI'GRI.[3] Lond. *Tincture of black Hellebore.*

"Take of the root of black hellebore sliced, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days, and filter."

Edinburgh. Dublin.

"Take of black hellebore-root bruised, (powdered, *Dub.*) *two ounces*; cochineal in powder, *fifteen grains*; (*two scruples*, Dub.); proof spirit, *fifteen ounces*, (*two pints*, Dub.) Digest for seven days, then filter through paper."

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[1] Teinture de Guajac (*F.*) Guajaktinktur (*G.*) Tintura di Guajac (*I.*)

[2] Tinct. Guaiacina volatilis, P. L. 1745. Teinture Ammoniacal de Guajac (*F.*) Ammonium guajaktinktur (*G.*) Alcoole Ammoniato con Guajaco; Tintura Guajachina volatile (*I.*)

[3] Tinctura Melampodii, P. L. 1745. Teinture d'Ellebore noir (*F.*) Tintura d'Elleboro (*I.*)

The smallness of the fibres of the root of black hellebore, which are the parts medicinally employed, renders it almost impossible to follow the direction of the London formula; and it is better to powder it coarsely, as ordered by the Dublin College. This tincture was regarded by Dr. Mead as a powerful emmenagogue, and is still ordered in uterine obstructions, and in some cutaneous affections. The dose is from ♏xxx. to fʒj. in any appropriate vehicle.

TINCTU'RA HU'MILI. Lond. Edin. *Tincture of Hops.*

"Take of hops, *five ounces*; proof spirit, *two pints*, (*two pounds and a half*, Edin.) Macerate for fourteen days, and strain; (seven days express the tincture, and filter through paper. *Edin.*)"

The lightness and bulk of the hops render it difficult to make the quantity of spirit here ordered act equally on the ingredients, therefore their surface should be several times changed by stirring, during the maceration, and the tincture expressed as ordered by the Edinburgh College. The tincture is supposed to possess the tonic and narcotic properties of the plant, and has been recommended as a substitute for tincture of opium in gout and rheumatism[1], but from the experiments of Dr. Bigsby, its efficacy is very [2] probematical. The dose is from fʒſs. to fʒij. or more.

TINCTU'RA HYOSCY'AMI. Lond. *Tincture of Henbane.*

"Take of the dried leaves of henbane, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days, and filter."

Dublin.

"Take of the dried leaves of black henbane in coarse powder, *two ounces and a quarter*; proof spirit, *a pint.* Digest for seven days; then strain."

TINCTURA HYOSCYAMI NIGRI. Edin. *Tincture of Black Henbane.*

"Take of the dried leaves of black henbane, *an ounce*; proof spirit, *eight ounces.* Digest for seven days, and filter through paper."

I have found this a more useful substitute than tincture of hops, for tincture of opium. In a dose of fʒj. it seldom fails of procuring sleep and quiet; and does not affect the head, or produce costiveness. In cases of diarrhœa, when this tincture is given, it will be necessary to add a few drops of tincture of opium to counteract the tendency it has to run off by the bowels.

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[1] *Freak's Observations on the Humulus Lupulus, 9. et passim.*

[2] *London Medical Repository.*

TINCTU'RA JAL'APÆ. Lond.[1] *Tincture of Jalap.*

"Take of jalap-root, powdered, *eight ounces*; proof spirit, *two pints.* Digest for fourteen days, then filter."

Dublin.

"Take of jalap-root in coarse powder, *five ounces*; proof spirit, *two pints.* Digest for seven days, then filter."

Tinctura Convolvuli Jalapæ. Edin. *Tincture of Jalap.*

"Take of jalap-root in powder, *three ounces*; proof spirit, *fifteen ounces.* Digest for seven days, and filter through paper."

Both water and alcohol separately extract part of the active principles of jalap, and proof spirit the whole of them; the combination of the gum, extractive, and resin of the root being requisite for the production of its full cathartic effect. The great difference in point of strength of these tinctures is much to be regretted.

TINCTU'RA KI'NO. Lond. *Tincture of Kino.*[2]

"Take of kino in powder, *three ounces*; proof spirit, *two pints.* Macerate for fourteen days, and strain."

Edinburgh. Dublin.

"Take of kino, *two ounces*; (*three ounces*, Dub.) proof spirit, *a pint and a half.* Digest for seven days, and filter through paper."

The matter in solution in this tincture is chiefly tannin. It is administered in chronic diarrhœa, the latter stage of dysentery, fluor albus, and in all cases in which astringents are indicated; but it is less certain in its operation than the tincture of catechu. The dose is from fʒj. to fʒij.

TINCTU'RA LYTTÆ. Lond. *Tincture of blistering Fly.*[3]

"Take of blistering flies bruised, *three drachms*; proof spirit, *two pints.* Macerate for fourteen days, and filter."

Tinctura Cantharides vescicatoriæ. Edin. *Tincture of Blistering Fly.*

"Take of blistering flies bruised, *a drachm*; proof spirit, *a pound.* Digest for seven days, and filter through paper."

Tinctura Cantharidis. Dub. *Tincture of Blistering Fly.*

"Take of blistering flies in powder, *two drachms*; cochineal in powder, *half a drachm*; proof spirit, *a pound and a half.* Digest for seven days, then strain."

Proof spirit extracts the active matter of the flies, and is a more convenient form for exhibiting it internally than in substance.

This tincture is useful in gleets, fluor albus, incontinence of urine, and in some cutaneous eruptions. The dose is from ♏ x. to fʒj. given in some demulcent infusion. As an external application it is efficaciously employed, in conjunction with *soap* or *camphor liniment*, as an embrocation against rheumatic pains; and I have found that a rag moistened with it is an useful application in that peculiar species of mortification of the extremities, which sometimes happens without any apparent cause; and to frost-bitten parts.

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[1] Tinctura Jalapæ, P. L. 1745, 1787.

[2] Teinture de Kino (*F.*)

[3] Tinct. Cantharidis, P. L. 1787. Teinture de Cantharides (*F.*) Cantharidentinktur (*G.*) Tintura di Cantaridi (*I.*)

TINCTU'RA MOSCHI. Dub. *Tincture of Musk.*[1]

"Take of musk in powder, *two drachms*; rectified spirit, *a pint*. Digest for seven days, then strain."

The only effectual form in which musk can be exhibited is in powder; much larger doses of it being requisite to do any good than can be given in a spirituous vehicle.

TINCTU'RA MYRRHÆ. Lond.[2] *Tincture of Myrrh.*

"Take of myrrh, bruised, *four ounces*; rectified spirit, *two pints*; water, *a pint*. Macerate for fourteen days, and filter."

Edinburgh.

"Take of myrrh in powder, *three ounces*; alcohol, *twenty ounces*; water, *ten ounces*. Digest for seven days, and filter through paper."

Dublin.

"Take of myrrh bruised, *three ounces*; proof spirit, *a pint and a half*; rectified spirit, *half a pint*. Digest for seven days, then strain."

A transparent tincture of a golden yellow colour may be prepared by treating myrrh with alcohol alone; but, by following the directions of the colleges, a rather turbid tincture is obtained; a circumstance which, *à priori*, might have been suspected. This tincture is tonic and deobstruent; but it is more generally used in gargles, combined with infusion of roses and acids; or as an application to foul ulcers, and exfoliating bones; or diluted with water, as a wash for the mouth when the gums are spongy. The dose is from fʒſs. to fʒj.

TINCTU'RA O'PII. Lond. *Tincture of Opium.*[3]

"Take of hard opium, powdered, *two ounces and a half*; proof spirit, *two pints*. Macerate for fourteen days, and strain."

TINCTURA OPII, sive THEBAICA; vulgo, LAUDANUM LIQUIDUM. Edin. *Tincture of Opium*, or *Thebaic Tincture*; commonly, *Liquid Laudanum.*

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[1] Teinture de Musc (*F.*) Tintura di Muschio (*I.*)

[2] Tinct. Myrrhæ simplex, P. L. 1720. Teinture de Myrrhe (*F.*) Myrrhentinktur (*G.*) Tintura di Mirra (*I.*)

[3] Teinture d'opium (*F.*) Opiums-tinktur (*G.*) Laudano liquido; Alcoole opiato (*I.*)

"Take of opium, *two ounces*; proof spirit, *two pounds*. Macerate for seven days, and filter through paper."

TINCTURA OPII, sive TINCTURA THEBAICA. Dub. *Tincture of Opium*, or *Thebaic Tincture.*

"Take of purified hard opium in coarse powder, *ten drachms*; proof spirit, *a pint*. Digest for seven days, then strain."

Owing to crude opium being now ordered by the London College instead of hard purified opium, the strength of the tincture formerly prepared is to that of the present tincture, as 3 to 2; or ♏ xiv. of the old tincture contained one grain of opium, and were equal to ♏ xix. of the present tincture. The Edinburgh tincture is of the same strength as the present London tincture; but the Dublin is stronger, ♏ xiv. of it containing one grain of opium. This tincture is used in all cases in which opium is indicated, and is a very convenient and elegant form of giving the remedy.[1] The usual dose is from ♏ x. to ♏ lx.; but in some morbid states of the habit very large doses can be borne, and are even necessary. In colica pictonum fʒj. given before using purges, facilitates their action, and renders the relief more speedy; and in tetanus fʒvſs. have been given in divided doses, with advantage in twenty-six [2] hours. As an external application, the tincture rubbed upon the skin produces its anodyne effects in a smaller degree, allays local pains, and assists in relaxing the spasm in lock-jaw and similar affections. Its powers as an external remedy are very much increased by combining it with vinegar; an acetate of morphia being thus produced.

TINCTURA OPII AMMONIATA; olim, ELIXIR PAREGORICUM. Edin. *Ammoniated Tincture of Opium*; formerly *Paregoric Elixir.*

"Take of opium, *two drachms*; benzoic acid, saffron, cut in shreds, of each, *three drachms*; volatile oil of aniseed, *half a drachm*; ammoniated alcohol, *sixteen ounces*. Digest for seven days, and filter through paper."

This tincture is useful in hooping-cough and spasmodic asthma. Each fʒj. contains gr. j. of opium.

TINCTURA QUASSIÆ EXCELSÆ. Edin. *Tincture of Quassia.*[3]

"Take of quassia wood rasped, *one ounce*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

TINCTURA QUASSIÆ. Dub. *Tincture of Quassia.*

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[1] It ought to be kept in opaque bottles; as light, according to the experiments of Vogel, has the power of decomposing it. Vide *Journ. Pharm.* Maii. 1815. p. 199.

[2] *Currie's Report on Cold Water*, i. 138.

[3] Teinture de Quassia (*F.*)

"Take of chips of quassia wood, *an ounce*; proof spirit, *two pints.* Digest for seven days, then strain."

This tincture contains the bitter of the wood in perfection, and may be used in the same cases as the infusion.

TINCTU'RA RHE'I.[1] Lond. *Tincture of Rhubarb.*

"Take of rhubarb root sliced, *two ounces*; cardamom seeds bruised, *an ounce and a half*; saffron, *two drachms*; proof spirit, *two pints.* Macerate for fourteen days in a gentle heat, and filter."

Dublin.

"Take of rhubarb root sliced, *two ounces*; lesser cardamom seeds husked and bruised, liquorice bruised, of each, *half an ounce*; saffron, *two drachms*; proof spirit, *two pints.* Digest for seven days, then filter."

Tinctura Rhei. Edin. *Tincture of Rhubarb.*

"Take of rhubarb root sliced, *three ounces*; lesser cardamom seeds bruised, *half an ounce*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

TINCTU'RA RHE'I COMPOS'ITA.[2] Lond. *Compound Tincture of Rhubarb.*

"Take of rhubarb root sliced, *two ounces*; liquorice root bruised, *half an ounce*; ginger root sliced, saffron, of each, *two drachms*; proof spirit, *a pint*; water, *twelve fluid ounces.* Macerate for fourteen days in a gentle heat, and filter."

TINCTURA RHEI ET ALOES. Edin. *Tincture of Rhubarb and Aloes*; formerly, *Sacred Elixir.*[3]

"Take of rhubarb root, sliced, *ten drachms*; Socotorine aloes powdered, *six drachms*; lesser cardamom seeds bruised, *half an ounce*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

TINCTURA RHEI ET GENTIANÆ. Edin. *Tincture of Rhubarb and Gentian.*

"Take of rhubarb root sliced, *two ounces*; gentian root, sliced, *half an ounce*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

All these tinctures of rhubarb are purgative and stomachic; but the strength of the menstruum is too great to permit of their general use for the first intention, and they are more usually employed as adjuncts to saline purgatives, to give them warmth, or to stomachic infusions in dyspepsia, flatulent colic, diarrhœa, the costiveness of old people, and of those of cold phlegmatic habits. The dose to operate as a purgative is fʒvj. and from fʒj. to fʒiij. to produce stomachic effects.

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[1] Tinctura Rhabarbari, P. L. 1720. 1787. Teinture de Rhubarbe (*F.*) Rhabarbertinktur (*G.*) Tinctura de Rhabarbaro (*I.*)

[2] Rhabarbari composita, P. L. 1787.

[3] Alcohol avec Aloé et Rhubarbe (*F.*) Alcoole Aloe-Rabarbarato (*I.*)

TINCTURA SCILLÆ. Lond. Edin. Dub. *Tincture of Squills.*

"Take of recent squill root (bulb) dried, *four ounces*, (*two ounces*, Edin.); proof spirit, *two pints*, (*sixteen ounces*, Edin.) Macerate for fourteen days, and filter." (Digest for seven days, then set it aside until the dregs are subsided, and pour off the clear liquor. *Dub.*)

Proof spirit takes up the active principles of the squill, and affords a convenient form of exhibiting it in all the cases in which it is indicated. The dose is from ♏x. to ♏xxx. given in almond mixture, ammoniac mixture, or mucilage.

TINCTURA SENNÆ. Lond. *Tincture of Senna.*[1]

"Take of senna leaves, *three ounces*; carraway seeds bruised, *three drachms*; cardamom seeds bruised, *a drachm*; raisins stoned, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days in a gentle heat, and filter."

Dublin.

"Take of senna leaves, *a pound*; carraway seeds bruised, *one ounce and a half*; lesser cardamom seeds husked and bruised, *half an ounce*; proof spirit, *a gallon.* Digest for fourteen days, then filter."

Tinctura Sennæ composita. Edin. *Compound Tincture of Senna.*

"Take of the leaves of senna, *two ounces*; jalap root bruised, *one ounce*; coriander seeds bruised, *half an ounce*; proof spirit, *three pounds and a half.* Digest for seven days, and to the filtered tincture add of refined sugar *four ounces.*"

These tinctures are stomachic and purgative. They are very efficacious in flatulent colic, atonic gout, and as an opening medicine for those whose bowels have been weakened by intemperance. The dose is from fʒij. to f℥j. in any appropriate vehicle.

TINCTURA SERPENTARIÆ. Lond. Dub. *Tincture of Snake Root.*

"Take of snake root, (cut and bruised, *Dub.*) *three ounces*; proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

Tinctura Aristolochiæ Serpentariæ. Edin. *Tincture of Snake Root.*

"Take of snake root, bruised, *two ounces*; cochineal in powder, *a drachm*; proof spirit, *two pounds and a half.* Digest for seven days, and filter through paper."

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[1] Elixir Salutis, P. L. 1720.

This tincture is a useful addition to infusion of cinchona bark, in typhoid and putrid fevers, gout, and periodic head-ach. The dose is from fʒſs. to fʒij.; or, when taken in water, as much as can be taken without the operation of the spirit proving hurtful.

TINCTURA TOLUIFERÆ BALSAMI. Edin. *Tincture of Balsam of Tolu.*

"Take of balsam of Tolu, *an ounce and a half*; alcohol, *a pound.* Digest until the balsam is dissolved, and filter through paper."

Tincture of balsam of Tolu is scarcely ever used except on account of its agreeable flavour. As it is decomposed by water, it is necessary to triturate it with mucilage, in order to mix it with any aqueous fluid. It is chiefly used for making the syrup.

Officinal preparation. *Syrupus Toluiferæ Balsami.* E.

TINCTURA VALERIANÆ. Lond. Dub. *Tincture of Valerian.*[1]

"Take of valerian root in powder, *four ounces*; proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

Proof spirit extracts the active matter of the valerian, but the tincture cannot be given in doses sufficiently large to prove very efficacious.

TINCTURA VALERIANÆ AMMONIATA. Lond. *Ammoniated Tincture of Valerian.*[2]

"Take of valerian root, *four ounces*; aromatic spirit of ammonia, *two pints.* Macerate for fourteen days, and filter."

Dublin.

"Take of valerian root in powder, *two ounces*; spirit of ammonia, *a pint.* Digest for seven days, then filter."

As the ammonia corresponds in virtue with the valerian, this tincture is more powerful than the foregoing. It is advantageously employed in hysteria and other nervous affections, in doses of fʒj. or fʒij. given in milk, or some other bland fluid.

TINCTURA VERATRI ALBI. Edin. *Tincture of white Hellebore.*

"Take of white hellebore root, bruised, *eight ounces*; proof spirit, *one pound and a half.* Digest for seven days, and filter through paper."

This tincture is sometimes employed to excite vomiting in maniacal and apoplectic cases; and as an alterative in cutaneous eruptions. It is given in doses of ♏ v. to ♏ x. but it is a very unmanageable remedy, producing sometimes the most violent effects.

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[1] Teinture de Valeriane (*F.*) Baldrian tinktur (*G.*) Tintura di Valeriana (*I.*)

[2] Tinctura Valerianæ volatilis, P. L. 1745. Baldriantinktur mit Ammonium liquor (*G.*)

TINCTURA ZINGIBERIS. Lond. Dub. TINCTURA AMOMI ZINGIBERIS. Edin. *Tincture of Ginger.*

"Take of ginger root sliced, *two ounces*; proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub. Edin.*) and filter."

This tincture possesses all the pungency of the ginger, and is useful as a stimulant and carminative, in atonic gout, when it attacks the stomach, in flatulent colic, and as a corrigent to griping purgatives.

ÆTHEREA.

PREPARATIONS OF ETHER.

THE action of the strong acids on alcohol produces an order of compounds, which possess both important chemical properties, and medicinal virtues. These are named ETHERS, and agree in certain general properties, but vary in some of their qualities according as they are produced from different acids. They are all extremely volatile, and require to be preserved in closely stopt phials.[1] The following are medicinally used.

ÆTHER SULPHURICUS. Lond. *Sulphuric Ether.*[2]

"Take of rectified spirit, sulphuric acid, of each, *one pound and a half.* Pour the spirit into a glass retort, and add the acid gradually to it, shaking it frequently, and taking care that the temperature of the mixture do not exceed 120°, until it be completed. Then cautiously place the retort in a sand-bath, previously heated to 200°, that the liquor may boil as quickly as possible, and the ether pass into a tubulated receiver to which another receiver is adapted, which is to be cooled by ice or water. Distil until a heavier fluid begins to pass over, which is seen in the bottom of the receiver below the ether. Pour on the liquor which remains in the retort twelve fluid ounces more of rectified spirit, and distil another portion of ether in a similar manner."

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[1] The phial proposed by Dr. Dewar is the best for this purpose. It consists of a stopt phial, having a circular rim round its shoulder, not rising quite so high as the mouth of the bottle, and a glass cup with a heavy bottom, which when inverted over the mouth of the phial into mercury, poured into the rim, hermetically closes it. *Annals of Phil.* vol. x. p. 20.

[2] Ether (*F.*) Schwefelätther (*G.*) Etere (*I.*)

Edinburgh.

"Take of sulphuric acid, alcohol, of each, *thirty-two ounces.* Pour the alcohol into a glass retort, capable of sustaining a sudden heat; then pour the acid on it in an uninterrupted stream. Mix them gradually by frequent and gentle agitation; then immediately distil from a sand-bath, previously heated for the purpose, into a receiver kept cold with water or snow. Let the fire be so regulated that the fluid may boil as soon as possible, and continue to boil until sixteen ounces shall have distilled over; then let the retort be removed from the sand-bath.

"To the distilled liquor, add two drachms of potash; then distil again from a high retort, with a very gentle heat, into a receiver kept cold, until ten ounces have passed over.

"If sixteen ounces of alcohol be added to the residuary acid after the first distillation, and the distillation repeated, ether will be reproduced. And this may be often repeated."

ÆTHER RECTIFICATUS. Lond. *Rectified Ether.*[1]

"Take of sulphuric ether, *fourteen fluid ounces;* fused potash, *half an ounce;* distilled water, *two fluid ounces.* First dissolve the potash in the water, and add the ether to it, shaking them well together, until they be mixed; lastly, in a heat of 120°, distil from a large retort into a cold receiver twelve fluid ounces of rectified ether."

ÆTHER SULPHURICUS. Dub. *Sulphuric Ether.*

"Take of sulphuric ethereal liquor, *twenty fluid ounces*; subcarbonate of kali dried and in powder, *two drachms.* Mix them, and distil from a high retort by means of a very gentle heat, into a receiver kept cold, twelve fluid ounces. The specific gravity of this fluid is to that of distilled water, as 765 to 1000."

The admixture of alcohol and sulphuric acid produces an almost instantaneous formation of ether, which is made sensible by the odour of the mixture; while by the mutual action of the spirit and the acid on each other a considerable evolution of caloric takes place, and the temperature of the mixture is raised to 180°. Whatever can encourage these effects in the first instance is to be avoided, as by the sudden rise of temperature, and the disengagement of ethereal vapours before the apparatus be adjusted, not only is the retort in danger of being broken, but a considerable waste of product also takes place. The directions of the Dublin College, therefore, to heat the spirit before pouring on the acid, are evidently improper; and the least objectionable mode for forming the mixture is undoubtedly that of the London College, if the retort be cooled after the addition of each portion of the acid. The retort should be thin, and the sand-bath previously heated to 208°, so that the liquor may boil immediately; for the ether is formed, and distils over at this temperature: whereas, by gradually raising the heat to this point, part of the alcohol comes over unaltered. The ether, as it distils, is condensed in the cool receivers, in the form of a colourless, limpid, transparent fluid; but towards the end of the operation a white vapour also comes over, on the appearance of which the distillation should be stopt. The receivers ought to be ample, and kept cool with ice or snow, or cold water, which we have found to be preferable to ice or snow. The best mode of applying it is to lay narrow shreds of woollen cloth over the receivers, with one end of each immersed in a vessel of cold water placed higher than the receivers, by which means the water is made to trickle constantly over them; and, by the evaporation which it suffers, the receivers are kept in a sufficiently low temperature, and at the same time, the nature of their contents is distinctly seen, which cannot be conveniently done when they are immersed in snow or ice, or even water. The luting which answers best in this operation is common paste, spread on slips of cloth, first applied, and then surrounded with pieces of wet bladder.

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[1] Ether vitriolicus, P. L. 1787.

The product of the first distillation, is sulphuric ether combined with water, some alcohol, and a small portion of sulphureous acid, forming an impure ether of the specific gravity ·768; and that of the second distillation, or after the addition of a new portion of alcohol, is a similar ether of the specific gravity ·807: on mixing these, a fluid of the specific gravity ·788 is obtained, which is the unrectified ether of the present London Pharmacopœia.[1] By the rectification of this ether according to the directions of the British Colleges, it is deprived of the sulphureous acid and nearly all the water, and its specific gravity reduced to ·732, or when highly rectified to ·725; but it still contains some water and alcohol, as ether of a specific gravity so low as ·632 in the temperature of 60° has been[2] obtained. The use of the alkali in the rectification is, by its affinity for the acid and the water, to separate and detain these; and this is still more completely accomplished by the addition of a portion of black oxide of manganese, which, by affording oxygen to the sulphureous acid, converts it into sulphuric acid, and thus renders it perfectly fixed at the temperature employed.

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[1] *London Medical Review*, April 1810, p. 163.

[2] Lowitz procured ether of this gravity by the following process. To ether reduced to ·746 specific gravity by means of subcarbonate of potash in the usual method, he added as much dry powdered muriate of lime as it would dissolve. On standing, the mixture separated into two parts; the alcohol holding the salt in solution sunk to the bottom; the ether swam on the surface. When separated from the inferior liquor, its specific gravity was now only ·632 in the temperature of 60°. *Thomson's Chemistry*, 4th ed. ii. 443.

The theory of the formation of ether is still unsettled. It has been contended, that the balance of affinities between the constituents of the alcohol is broken by the acid, the oxygen of which attracting a portion of the hydrogen of the alcohol forms water; while a portion of its carbon, at the same time set free, forms the residuary black matter found in the retort; and, by a new combination of the remaining hydrogen, carbon, and oxygen, the ether is produced. This explanation, however, which supposes a partial decomposition of the acid, has been denied by Fourcroy and Vauquelin, who, from a series of very ingenious experiments[1], concluded, that the acid suffers no decomposition, except towards the end of the process, which is to be attributed to the carbonaceous matter collected in the retort; but that it produces the decomposition of the alcohol without being itself decomposed, by the exertion alone of a disposing affinity. The ether, according to them, is the result of the new combination of the components of the alcohol, part of its oxygen and hydrogen first combining to form water, and a large portion of its carbon being separated without entering into any new combination; so that ether differs from alcohol only in containing a greater proportion of hydrogen and oxygen, and a smaller proportion of carbon. Several objections have been raised to this theory; but, as in a work of this nature it is not necessary to enter minutely into theoretical discussions, I shall only observe, that the most probable opinion is, that the sulphuric acid acts merely by abstracting water from the alcohol, neither transferring any thing to, nor further decomposing it; or, that ether is merely alcohol deprived of one half its water. The sulphureous and carbonic acids, and the charry residue formed in the process, are produced by the decomposition of a portion of the alcohol, by the acid; but this decomposition is not essential for the formation of ether. According to the experiments on which this opinion is founded, alcohol consists of 100 of olefiant gas and 50 of water. Ether consists of 100 parts of olefiant gas and 25 of water. According to Saussure, jun. the ultimate components of 100 parts of ether are, 67·98 of carbon, 14·40 of hydrogen, and 17·62 of oxygen.

Qualities.—Ether has a fragrant penetrating odour, and a hot pungent taste. It is colourless and perfectly limpid; and is the most volatile of liquids, drying immediately if poured on the hand, and producing a great degree of cold by its evaporation. It boils in the open air at 98 , and in vacuo at a temperature considerably below the common freezing point;

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[1] *Annales de Chimie*, xxiii. 203.

and, but for the pressure of the atmosphere, would always be be in a gaseous form. When cooled down to — 46°, ether congeals in brilliant transparent plates. It is extremely inflammable, taking fire on the approach of any ignited body, a circumstance which requires to be attended to in pouring it from one phial to another by candle-light. During its combustion carbonic acid is formed, and traces of charcoal are left behind. It unites with alcohol in every proportion, and also readily mixes with ammonia; but ten parts of water take up only one of ether. It dissolves volatile oils, bitumens, camphor, extractive, and resins. It is decomposed by sulphuric acid.

Medical properties and uses. — Sulphuric ether is stimulant, narcotic, and antispasmodic. In its operation it resembles alcohol, but is more diffusible, and its effects are less permanent. It is beneficially employed as a cordial in typhoid and low fevers, particularly when nausea, subsultus tendinum, and other spasmodic symptoms are present. As an antispasmodic, it relieves the paroxysm of spasmodic asthma, whether it be taken into the stomach, or its vapour only be inhaled into the lungs; in which latter form it is also useful in simple dyspnœa and in catarrh. Much caution, however, is required in inhaling the vapour of ether, as the imprudent inspiration of it has produced lethargic and apoplectic symptoms. It is employed with advantage in hysteria, tetanus, cramp of the stomach, hiccough, and in cholera morbus, to check the vomiting; and also allays the violence of sea-sickness. The usual dose of sulphuric ether is from fʒſs. to fʒij.; but it has been given in much larger doses with the most beneficial effects; and in all cases the dose must be repeated at short intervals to produce the full effect of the remedy. As an external application, ether acts either as a stimulant or a refrigerant, according to the mode in which it is applied. The first takes place when it is prevented from evaporating, by being confined over the spot to which it is applied; in which case it often proves useful in relieving head-ach and other muscular pains: and from its refrigerant effect produced by its rapid evaporation, it is applied to burns, and to assist in the reduction of strangulated hernia. We have seen it produce almost immediate relief in ear-ach, when dropped into the external meatus.

Officinal preparation. *Spiritus Ætheris sulphurici.* L.

OLEUM ÆTHEREUM. Lond. *Ethereal Oil.*[1]

After the distillation of sulphuric ether, distil again the remaining liquor with a gentle heat, until a black froth swells up; then immediately remove the retort from the fire. To the liquor in the retort add water sufficient that the oily part may float upon it. Let this be skimmed off, and as much lime-water be added to it as will neutralize any acid it may contain; and shake them together. Lastly, take off the ethereal oil after it has separated."

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[1] Oleum Vini, P. L. 1787. Huile douce de vin (*F.*) Oleo dolce di Vino (*I.*)

LIQUOR ÆTHEREUS OLEOSUS. Dub. *Oily Ethereal Liquor.*

" Take what remains in the retort after the distillation of sulphuric ether. Distil to one half, by a moderate heat."

The product of both of these processes is a thick oily matter, of a yellow colour, less volatile than ether, soluble both in ether and alcohol; but insoluble in water. Its nature is not clearly ascertained: for, although Fourcroy and Vauquelin consider it as similar to ether, and differing from it principally in containing a larger proportion of carbon; yet other chemists maintain that it is merely a compound of ether and sulphureous acid: but with regard to either of these opinions, it is still necessary to suspend our judgment. It can be obtained more directly, although less economically, by distilling ether with a portion of sulphuric acid. It is used only for the preparation of the compound spirit.

Officinal preparation. *Spiritus Ætheris compositus.* L. D.

SPIRITUS ÆTHERIS AROMATICUS. Lond. *Aromatic Spirit of Ether.*[1]

" Take of cinnamon bark bruised, *three drachms*; cardamom seeds powdered, *a drachm and a half*; long pepper powdered, ginger-root sliced, of each, *a drachm*; spirit of sulphuric ether, *a pint*. Macerate for fourteen days in a stopped glass bottle, and strain."

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. Edin. *Aromatic Sulphuric Ether with Alcohol.*

" Take of cinnamon bark bruised, cardamom seeds bruised, each *an ounce*; long pepper bruised, *two drachms*; sulphuric ether with alcohol, *two pounds and a half*. Digest for seven days, and filter through paper."

These preparations do not differ in their medicinal properties from the former; the aromatics rendering them only a little more grateful.

SPIR'ITUS Æ'THERIS NIT'RICI.[2] Lond. *Spirit of Nitric Ether.*

" Take of rectified spirit, *two pints*; nitric acid (by weight), *three ounces*. Add the acid gradually to the spirit, and mix them, taking care that the temperature, during the mixture, does not exceed 120°; then distil, by a gentle heat, twenty-four fluid ounces."

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[1] Elixir Vitrioli dolce, P. L. 1745.

[2] Spiritus Nitri dulcis, P. L. 1745. Spir. Ætheris nitrosi, P. L. 1787. Alcool ethereux par l'acide nitrique (*F.*) Atherischer salpeterspiritus (*G.*) Spirito di nitro dolce (*I.*)

SPIRITUS ÆTHERIS NITROSI. Edin. *Spirit of Nitrous Ether.*

"Take of alcohol, *three pounds;* nitrous acid, *one pound;* pour the alcohol into a large phial placed in a vessel full of cold water, and add the acid gradually, with frequent agitation. Let the phial be slightly corked, and placed in a cool place for seven days; then distil the liquor by the heat of boiling water, into a receiver kept cool with snow or water, as long as any spirit comes over."

SPIRITUS ÆTHEREUS NITROSUS. Dub. *Nitrous Ethereal Spirit.*

"Add to the matter which remains after the distillation of nitrous ether, the rectified spirit of wine, employed in that operation for condensing the elastic vapour, and distil to dryness, with the greater heat of a water-bath. Mix the distilled liquor with the alkaline liquor which remains after the separation of the nitrous ether, and also add as much dry subcarbonate of kali as shall be sufficient to saturate the predominant acid; which is to be determined by the test of litmus. Lastly, distil by the medium heat of a water-bath, as long as any fluid comes over. The specific gravity of this liquor is to that of distilled water, as 850 to 1000."

The products of the London and Edinburgh processes are in every respect the same; but the former is to be preferred on account of the length of time required by the latter. The small quantity of acid in proportion to the alcohol employed permits the mixture to be effected without any violent action taking place, or the evolution of much heat, provided the acid be added in small quantities and at intervals, and each portion be thoroughly mixed with the alcohol before another be added. The heat employed for the distillation should not exceed 212°, and it should be stopped as soon as twenty-four fluid ounces come over; for when it is longer continued the product becomes coloured, and contains too much free acid.[1] The theory of the operation, inasmuch as relates to the production of the nitric ether, which is thus obtained in combination with a large proportion of unchanged alcohol and a small proportion of nitric acid, is the same as that already detailed; and the entire product has the same relation to nitric ether as spirit of sulphuric ether has to sulphuric ether.

The product obtained by the first part of the Dublin process is analogous to the above. The acid which the residue of the distillation of nitrous ether contains, and the alcohol already impregnated with a small portion of that fluid, when mixed and heated, act reciprocally on each other, and a compound of nitric ether, unchanged alcohol, and free acid, distils over; but the alkali, with which it is mixed before the second distillation, removing the acid, its properties, both as a chemical compound and as a remedy, must be necessarily altered. The products of the former processes are those which have been longest known and most extensively employed.

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[1] *London Medical Review*, April 1810, p. 164.

Qualities. — Spirit of nitric ether, as procured by the London or the Edinburgh process, has an extremely fragrant odour, and a pungent acidulous taste. It is very volatile and inflammable; soluble in water and in alcohol; and strikes a deep olive with solution of green sulphate of iron.

Medical properties and uses.— Spirit of nitric ether is refrigerant, diuretic, and antispasmodic. It has long been employed under the title of *Sweet Spirit of Nitre*, as a grateful refrigerant, and to quench thirst in febrile affections; for which purpose the dose is from ℳxx. to ℳxl. given in a cupful of water, or any other appropriate vehicle. In larger doses it acts as a gentle stimulant to the stomach, relieving nausea and flatulence; and also determines to the kidneys, increasing the flow of urine; on which account it is advantageously prescribed as an auxiliary to other diuretics in dropsical complaints.

SPIRITUS ÆTHERIS SULPHURICI. Lond. *Spirit of Sulphuric Ether.*

" Take of sulphuric ether, *half a pint*; rectified spirit, *a pint*. Mix them."

ÆTHER SULPHURICUS CUM ALCOHOLE. Edin. *Sulphuric Ether with Alcohol.*

" Take of sulphuric ether, *one part*; alcohol, *two parts.* Mix them."

LIQUOR ÆTHEREUS SULPHURICUS. Dub. *Sulphuric ethereal Liquor.*

" Take of rectified spirit of wine, sulphuric ether, of each, *thirty-two ounces.* Let the spirit heated to 120° be poured into a glass retort fit to bear a sudden heat, and add the acid in an uninterrupted stream; let them be gradually mixed, and by means of a quick and sufficiently powerful heat, distil twenty ounces of the liquor into a receiver kept cool.

" If sixteen ounces of rectified spirit of wine be poured on the residuary acid in the retort, more sulphuric ethereal liquor will be obtained by repeating the distillation."

In the old method of preparing this spirit by distilling the charge for sulphuric ether by a slow and gradually increased heat, an alcoholized ether was obtained, owing to part of the alcohol first passing over unaltered before the ether was formed, the specific gravity of which was ·768; but the gravity of the above mixture is ·816, showing that it contains considerably less ether in combination with the alcohol.

Medical properties and uses.—It may be used for the same purposes as the ether; but it is necessarily much less active. The dose is from fʒj. to fʒiij. An useful gargle for slight inflammation of the fauces is prepared by adding fʒj. of this spirit to f℥vj. of barley-water, sweetened with fʒiv. of syrup of marsh-mallows.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. Lond. *Compound Spirit of Ether.*[1]

"Take of spirit of sulphuric ether, *a pint;* ethereal oil, *two fluid drachms.* Mix them."

This is intended as a substitute for the *Anodyne Liquor of Hoffmann*; and, besides being stimulant and antispasmodic, it is supposed to possess anodyne properties. It is an useful addition to tincture of opium, when given with the intention of procuring sleep; and often prevents the opium from exciting the nausea which it is apt to produce in some habits. The dose is from fʒſs. to fʒij. in any appropriate vehicle.

ÆTHER NITROSUS. Dub. *Nitrous Ether.*

"Take of nitrate of kali, dried and coarsely powdered, *a pound and a half*; sulphuric acid, *a pound*; rectified spirit of wine, *nineteen fluid ounces.* Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it in small quantities, and at intervals, the sulphuric acid and the spirit previously mixed together, and allow the mixture to become cold. Without any external heat, or at least a very gentle one, (such as may be communicated by the addition of a little tepid water to the bath,) an ethereal liquor will begin to distil. In a short time the heat of the retort will spontaneously increase, and a considerable ebullition take place, which must be moderated by adding some cold water to the bath. The receiver must also be kept cool with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture with great force if the heat be too much increased) through a pound of rectified spirit of wine in a phial which is to be kept cold.

"The ethereal liquor, thus spontaneously distilled, is to be put into a glass phial, fitted with a ground glass stopper, and as much subcarbonate of kali, dried, and in powder, is to be added as is necessary to neutralize the acid, closing the phial after each addition of the kali, and determining the neutralization by the test of litmus: about a drachm of salt is generally sufficient for this purpose; and in a short time the nitrous ether will rise to the surface, and is to be separated by means of a funnel.

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[1] Alcool éthéreux par l'acide sulphurique (*F.*) Atherischer Schwefelegent Liquor (*G.*) Anodino minerale dell' Hoffmann (*I.*)

"If the ether is required to be very pure, distil it again from a water-bath, at a temperature of 140°, to one half. Its specific gravity is to that of distilled water, as 900 to 1000."

The action of nitric acid on alcohol is so violent, that the formation of ether which it affords, has always been regarded as a process of great difficulty, to obviate which many ingenious plans have been suggested. The operation which has been just described is admirably adapted for procuring it with facility and safety. It was contrived by Woulfe, and was found by Pelletier to succeed better than any other. The sulphuric acid and the spirit must be mixed with the same degree of caution as is necessary in preparing sulphuric ether; and the receiver must be larger, and kept perfectly cool, with the apparatus, described in the formulæ, attached to it, which should be kept cool by a mixture of snow or ice and muriate of lime.

In the above process, the nitrate of potash is first decomposed, and nitric acid formed, which acts upon the alcohol as it evolves. The theory of this action is very obscure: but from a number of well contrived experiments Thenard was led to draw the following conclusions. Both the acid and the alcohol are decomposed; the oxygen of the former combines with a large proportion of the hydrogen, and a small quantity of the carbon of the alcohol, and thence result, "1st, Much water and nitrous oxide, and small quantities of carbonic acid, nitrous acid, and nitric oxide. 2dly, The separation of a small quantity of nitrogen, and the formation of much nitric ether by the combination in large quantity of the two elements of the nitric acid, with the alcohol from which the large proportion of hydrogen and small proportion of carbon have been abstracted. 3dly, The formation of acetic acid, and of a matter disposed to pass to the state of charcoal, by the combination, in certain proportions, of the hydrogen and carbon of the alcohol with the oxygen of the nitric acid."[1]

Qualities.—Nitrous, or rather nitric ether has a strong ethereal odour, but is less fragrant than sulphuric ether. Its taste is strong and peculiar; and its colour slightly yellow, probably arising from the presence of a small portion of nitric oxide. When highly rectified, its specific gravity is 0·866[2]: it is more volatile than sulphuric ether, boiling at a temperature of 70°, and consequently producing a greater degree of cold by its evaporation; and is very inflammable. It requires 48 parts of water for its solution, but combines with alcohol in every proportion; and readily absorbs nitrous and acetic acids, both of which acids are formed in it when it is kept for some time. According to the analysis of Thenard, the constituents of 100 parts of nitric ether are 48·52 of oxygen, 28·45 of carbon, 14·49 of azote, and 8·54 of hydrogen: but this analysis is liable to some exceptions.

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[1] *Murray's Chemistry*, 2d ed. iv. 447.

[2] Duncan, *New Edinburgh Dispensatory*, 5th ed. 567.

Medical properties and uses. — Nitric ether, although introduced into the Dublin Pharmacopœia, has not yet been generally used in practice; but it is probable that its properties are the same as those of sulphuric ether, and consequently it is applicable to the same cases.

VINA.

WINES.

WINE acts upon vegetable substances in nearly the same manner as diluted spirit, dissolving such of their proximate principles as can be taken up by water and alcohol when combined: hence it has been long used as a menstruum for extracting the active parts of medicinal vegetables; and the solutions thus formed have been denominated *Medicated Wines.* As a solvent, however, it is liable to the objection of inequality of strength; and owing to the spontaneous decomposition which it undergoes from exposure to the air, it is still more objectionable, this change being likely to take place sooner when it is imbued with principles all of which tend to hasten the fermentative process. To remedy these disadvantages in this class of preparations, Parmentier has proposed [1], that instead of preparing medicated wines in the usual method, the alcoholic tinctures well prepared should be added to wine in given quantities: by which means, he contends, the preparations are less nauseous, and, what is a still greater advantage, are always of a determinate strength. The British Colleges, however, still order medicated wines to be prepared after the old method. They should be kept in very well corked bottles, and in a cool situation. By the general term Wine, the London College means to designate Sherry Wine.

VINUM ALOES. Lond. *Wine of Aloes.*[2]

" Take of extract of spiked alöes, *eight ounces;* canella bark,

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[1] *Annales de Chimie,* lii. 46.

[2] Vin d'Aloé (*F.*) Vino Aloetico (*I.*)

two ounces; wine, *six pints;* proof spirit, *two pints.* Rub the alöes to powder with white sand previously freed from any impurities; rub the canella bark also into powder, and on these, mixed together, pour the wine and spirits. Macerate for fourteen days, frequently shaking the vessel containing the mixture, and afterwards strain."

Dublin.

"Take of Socotorine alöes, *four ounces;* canella alba, *an ounce;* Spanish white wine, *three pints;* proof spirit, *a pound.* Let the alöes and the canella alba, separately reduced to powder, be mixed together, and pour on them the wine mixed with the spirit; then digest for fourteen days with frequent agitation; and lastly, strain the solution."

VINUM ALÖES SOCOTORINÆ. Edin. *Wine of Socotorine Alöes.*

"Take of Socotorine alöes in powder, *one ounce;* lesser cardamom seeds bruised, ginger root bruised, of each *a drachm;* Spanish white wine, *two pounds.* Digest for seven days, shaking the mixture frequently, and strain."

Wine is an excellent solvent of alöes, and therefore this solution contains all the virtues of the remedy in a more agreeable form than that of tincture. The sand ordered by the London College is intended to facilitate the pulverization of the alöes; but although it does not in the least affect the solution, yet it is seldom used; for by cutting the alöes into small pieces, and exposing them to the air, they become sufficiently pulverulent.

Medical properties and uses.—Wine of alöes is an excellent warm purgative and stomachic. It has long been employed with benefit in cold phlegmatic habits, paralysis, gout, dyspepsia, and chlorosis. The dose is from fʒj. to fʒij. to act as a stomachic, and from f℥j. to f℥ij. to produce purging.

VINUM GENTIANÆ COMPOSITUM. Edin. *Compound Wine of Gentian.*[1]

"Take of gentian root, *half an ounce;* cinchona bark, *one ounce;* orange peel dried, *two drachms;* canella alba, *one drachm;* proof spirit, *four ounces;* Spanish white wine, *two pounds and a half.* First pour the proof spirit on the root and the barks sliced and bruised; and after twenty-four hours add the wine; then macerate for seven days, and strain."

This wine when newly prepared is stomachic and tonic, but by keeping it is very apt to become acescent. The dose is from fʒiv. to fʒvj. given two or three times a day.

VINUM IPECACUANHÆ. Lond. *Wine of Ipecacuanha.*[2]

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[1] Vin de Gentiane composé (*F.*) Vino di Genziana composto (*I.*)

[2] Vin d'Ipecacuanha (*F.*) Vino con Ipecacuana (*I.*)

"Take of ipecacuanha root bruised, *two ounces*; wine *two pints.* Macerate for fourteen days, and filter."

Edinburgh.

"Take of the root of ipecacuanha bruised, *one part*; Spanish white wine, *fifteen parts.* Macerate for seven days, and filter through paper."

Dublin.

"Take of the root of ipecacuanha bruised, *two ounces*; Spanish white wine, *two pints.* Digest for seven days, then filter."

From my trials I find that a pint of sherry wine takes up 100 grains of ipecacuanha, which is the larger proportion of the soluble matter contained in an ounce of the root; and as the active part of the root, or emetin, is more soluble in acetic acid than any other menstruum, the acescency of the wine is no objection. As an emetic is it equally efficacious, and at the same time milder in its operation than antimonial wine, and is therefore better adapted for infants. For this purpose a teaspoonful, or fʒſs. is given for a dose, and repeated every ten minutes till it operates. In smaller doses it answers the same purposes as the powder, and is given in coughs, diarrhœa, dysentery, and other complaints in which a determination to the skin is indicated.

VINUM NICOTIANÆ TABACI. Edin. *Wine of Tobacco.*

"Take of tobacco leaves, *one part*; Spanish white wine, *twelve parts.* Macerate for seven days, and filter through paper."

This is the only form in which tobacco can be conveniently exhibited as an internal remedy. It is given to produce diuretic and antispasmodic effects in dropsies, colica pictonum, and ileus. The dose is from ♏ x. to ♏ xxx. in any proper vehicle.

VINUM OPII. Lond. Edin. *Wine of opium.*[1]

"Take of extract of opium, *an ounce*; cinnamon bark, bruised, cloves bruised, of each *a drachm*; wine *a pint.* Macerate for eight days, (seven days, *Edin.*) and filter."

Wine extracts the active matter of opium, and forms a solution which agrees in its properties with the alcoholic tincture; but the aromatics this preparation contains are supposed to modify the action of the opium, and prevent the disturbance of the brain and nervous system, which the simple tincture is apt to induce in nervous habits, and where the head is much affected. Mr. Ware introduced the use of this tincture as a local application in the second stage of ophthalmia; when the inflammatory symptoms have subsided, and the vessels of the conjunctiva remain turgid with red blood. Two or three drops are dropped into the eye every morning, until the redness is removed.

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[1] Laudanum liquidum Sydenhami, P. L. 1720. Vin d'Opium aromatique (*F.*) Vino aromo opiato (*I.*)

VINUM RHEI. Edin. *Wine of Rhubarb.*

"Take of rhubarb root, sliced, *two ounces*; canella bark, bruised, *a drachm*; proof spirit, *two ounces*; Spanish white wine, *fifteen ounces*. Macerate for seven days, and filter through paper."

This wine, when newly prepared, has the same properties, and may be applied to the same uses as the tincture, but it is liable to undergo decomposition. The dose is from f℥ſs. to f℥j. or more.

VINUM VERATRI, Lond. *Wine of white Hellebore.*

"Take of white hellebore root, bruised, *eight ounces*; wine, *two pints and a half.* Macerate for fourteen days, and filter."

This preparation was supposed to form one of the ingredients of the Eau Medicinale; but this opinion is unfounded. It is seldom employed.

ACETICA.

Preparations of Vinegar.

Vinegar is capable of dissolving all those proximate principles of plants which are soluble in water; and it is further found to extract more completely than any other solvent, the acrid matter on which the efficacy of squill and colchicum depends. As a solvent, however, of vegetable matter, the use of vinegar cannot be extended, as it destroys the medicinal properties of some vegetable principles, and does not accord with others in virtue. Medicated vinegars are very apt to spoil, notwithstanding the addition of spirit which is ordered; and therefore they should be made in small quantities only at a time, and preserved in well stopped glass bottles.

ACIDUM ACETICUM AROMATICUM. Edin. *Aromatic Vinegar.*[1]

"Take of rosemary tops, dried, sage leaves, dried, of each *one ounce*; lavender flowers dried, *half an ounce*; cloves, bruised, *half a drachm*; distilled vinegar, *two pounds.* Macerate for seven days, and filter the expressed liquor through paper."

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[1] Vinaigre antiseptique (*F.*) Gewürzessig (*G.*) Aceto antisettico (*I.*)

This preparation has a pleasant pungent aromatic odour. It is a solution of the volatile oils of the substances employed in vinegar, and is a grateful perfume in sick-rooms; but has no right to be regarded as a prophylactic from fever, or other contagions. It is nearly the same as the old preparation, known under the name of *Thieves's Vinegar.*

ACIDUM ACETICUM CAMPHORATUM. Edin. ACIDUM ACETICUM CAMPHORATUM. Dub. *Comphorated Acetic Acid.*[2]

"Take of acetic acid, (acetic acid, *Dub.*) *six ounces;* camphor, *half an ounce.* Rub the camphor to powder with the assistance of a little alcohol; then dissolve it in the acid."

The strong acetic acid readily dissolves a considerable portion of camphor; and forms a very highly pungent and stimulating perfume, which, snuffed up the nostrils, is useful in syncope and nervous languors. Owing to its extreme volatility when well prepared, it requires to be preserved in phials closely fitted with ground-glass stoppers.

ACETUM COLCHICI. Lond. *Vinegar of Meadow Saffron.*

"Take of fresh meadow saffron root (bulb) sliced, *an ounce;* acetic acid, (distilled vinegar) *a pint*; proof spirit, *a fluid ounce.* Macerate the meadow saffron root with the vinegar in a covered glass vessel for twenty-four hours; then express, and set the liquor aside that the fæculencies may subside; lastly, add the spirit to the clear liquor."

The bulb of the meadow saffron is the part intended to be ordered, not the root. When dug up in autumn it contains an acrid principle resembling that of the squill, of which vinegar is the proper solvent; and this solution is now introduced as a better form of preserving the virtues of the remedy than the oxymel. It is given as a diuretic in ascites and hydrothorax; but is less to be depended on than the squill. Like the preparation with wine, which is not yet admitted into the Pharmacopœia, it may be given in gout. The dose is from fʒſs. to fʒj. united with honey, or in any bland fluid.

ACETUM SCILLÆ.[2] Lond. *Vinegar of Squill.*

"Take of fresh squill root (bulb) dried, *a pound*; acetic acid, (distilled vinegar) *six pints*; proof spirit, *half a pint.* Macerate the squill root (bulb) in the vinegar with a gentle heat, in a covered vessel, for twenty-four hours; then express the liquor and set it aside that the fæculencies may subside; lastly, add the spirit to the clear liquor."

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[1] Acide acetique Camphré (*F.*) Aceto Canforato (*I.*)

[2] Acetum scilliticum, P. L. 1720. 1745. Vinaigre scillitique (*F.*) Meerzwiebelessig (*G.*)

ACIDUM ACETICUM SCILLITICUM. Edin. *Vinegar of Squill.*

"Take of squill root (bulb) dried, *one ounce;* distilled vinegar, *fifteen ounces;* alcohol, *one ounce and a half.* Macerate the squill with the acid for seven days; then express the liquor, and add to it the alcohol; and when the fæculencies have subsided, pour off the clear fluid."

ACETUM SCILLÆ. Dub. *Vinegar of Squill.*

"Take of fresh squill root (bulb) dried, *half a pound;* wine vinegar, *three pints;* rectified spirit, *four fluid ounces.* Digest the squill with the vinegar for four days in a glass vessel, with frequent agitation; then express the vinegar, and, after the fæculencies have subsided, add to it the spirit."

Vinegar extracts the acrid matter of the squill, upon which its efficacy as a remedy depends. It has long been used as an expectorant and diuretic in chronic catarrh, humoral asthma, and dropsies. The dose is from fʒſs. to fʒij. given in cinnamon or mint water. In larger doses it produces vomiting; and is occasionally used as an emetic in the above diseases, when the stomach is loaded.

When kept, the vinegar of squill deposits a precipitate, which consists of citrate of lime and tannin.[1]

Officinal preparations. *Oxymel Scillæ.* L. *Syrupus Scillæ.* E.

MELLITA.

PREPARATIONS OF HONEY.

A MORE correct knowledge of the operation of those medicinal substances which have been named *balsamic* or *pectoral,* has set aside the high opinion which formerly prevailed of the efficacy of honey as a remedy in pulmonary diseases. It is, however, still employed in pharmacy, and has some advantages over syrup, particularly where it is to be employed as a local application; but for internal purposes its use is to a certain degree limited, owing to the unpleasant effects which it produces on the bowels of some individuals. The Edinburgh College has altogether rejected this class of preparations, but a few of them are retained by the London and Dublin Colleges. They are not apt to spoil, and therefore require less care to preserve them than the syrups.

MEL DESPUMATUM. Lond. Dub.[2] *Clarified Honey.*

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[1] Vogel. *Annales de Chimie,* vol. lxxxiii. p. 157.

[2] Miel despumé (*F.*) Geschäumter Honig (*G.*) Mele Schiumato (*I.*)

"Melt the honey in a water-bath: then remove the scum."

By thus liquefying honey, the wax it may have retained when expressed from the comb rises to the surface; and at the same time any sand or other impurities with which it may have been fraudulently mixed, fall to the bottom or rise with the wax, and are easily separated. The specific gravity of purified honey is 1·31; it is chiefly employed for forming the other preparations into which honey enters.

MEL BORACIS. Lond. *Honey of Borax.*

"Take of sub-borate of soda, powdered, *a drachm;* clarified honey, *an ounce.* Mix them."

This is a cooling, detergent, useful application to the tongue and fauces in aphthous affections. Dissolved in water it forms an excellent gargle for allaying the pain attending mercurial salivations.

MEL ROSÆ. Lond. *Rose Honey.*[1]

"Take of the petals of the red rose, dried, *four ounces*; boiling water, *three pints*; clarified honey, *five pounds.* Macerate the petals in the water for six hours; then to the filtered liquor add the honey, and boil it down to a proper consistence by means of a water-bath."

Dublin.

"Take of the petals of red rose buds, dried and freed from their claws, *four ounces*; boiling water, *three pints*; honey, *five pounds.* Macerate the petals in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the consistence of a syrup, taking off the scum."

This honey has the pleasant flavour of the rose, and a slight degree of astringency. In making it, the clarified honey ordered by the London College is to be preferred. It is chiefly employed as an adjunct to detergent and astringent gargles.

OXYMEL SIMPLEX.[2] Lond. Dub. *Oxymel.*

"Take of clarified honey, *two pounds*; acetic acid (distilled vinegar), *one pound.* Boil them in a glass vessel, by a gentle heat, to a proper consistence."

Simple oxymel in doses of fʒj. or more, dissolved in barley-water, forms a pleasant and cooling beverage in fevers and inflammatory affections. It is often added to gargles in cynanche tonsillaris, and is a common vehicle of other remedies in catarrhal complaints. The Dublin College orders it to be prepared with unclarified honey, skimming it during the boiling; but the London directions are to be preferred.

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[1] Mel Rosarum, P. L. 1720. Mel rosaceum, P. L. 1745. Miel rosat (*F.*) Rosenhonig (*G.*) Mele rosato (*I.*)

[2] Mel acetatum, P. L. 1787. Oxymel (*F.*) Essighonig (*G.*) Ossimele (*I.*)

OXYMEL COLCHICI. Dub. *Oxymel of Meadow Saffron.*

"Take of the fresh root (bulb) of meadow saffron cut into thin slices, *one ounce*; distilled vinegar, *a pint*; clarified honey, *two pints*. Digest the colchicum with the vinegar, in a glass vessel, for two days; then to the liquor strongly expressed from the root, add the honey; and lastly, boil down the mixture to the consistence of a syrup, frequently stirring it during the boiling with a wooden spoon."

The active matter of the colchicum is apt to be injured by the boiling; and hence this preparation is very uncertain in point of strength. It is given in humoral asthma, and in dropsies. The dose is fʒj. gradually increased to f℥j, given in a cupful of gruel, twice a day.

OX'YMEL SCIL'LÆ.[1] Lond. Dub. *Oxymel of Squill.*

"Take of clarified honey, *three pounds*; vinegar of squill, *two pints*. Boil in a glass vessel, over a gentle fire, to a proper consistence."

Oxymel of squill is principally employed as an expectorant, and as such is very useful in humoral asthma, and chronic coughs, in doses of from fʒſs to fʒij. It is generally given in some aromatic distilled water, to prevent the nausea which it is apt to induce; in larger doses it is given to excite vomiting, and at the same time clear the chest, in hooping-cough.

When kept for a considerable time, this oxymel lets fall a precipitate which has the aspect of crystallized honey. Vogel found it to consist of citrate of lime, tannin, and honey.[2]

SYRUPI.

SYRUPS.

THESE are saturated solutions of sugar in water, either simple, or united with some vegetable principle, with the view either to colour, flavour, or medicinal virtue: but for the last intention, this is perhaps the worst of all forms for obtaining the medical qualities of substances: and, therefore, as syrups seldom possess much activity, they are chiefly employed to render more active remedies palatable. Upon the whole, however, they are not well adapted even for this purpose, few persons thinking that sweetness renders a nauseous drug more palatable; and, with a few exceptions, they might be properly rejected from the pharmacopœias.

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[1] Oxymel scilliticum, P. L. 1720. 1745. Meerzwiebelhonig (*G.*)

[2] *Annales de Chimie*, vol. lxxxiii. p. 157.

In making syrups, refined sugar should always be employed; or, if coarser sugar be used, the syrup should be clarified, by beating to a froth the white of eggs with a small portion of water, and adding it to the solution of sugar and water before boiling. The albumen coagulates as the syrup boils, and, involving the impurities which the sugar contained, rises to the surface in the form of a scum, which must be carefully removed. If too much sugar be used, or if the syrup be too long boiled, the sugar soon crystallizes; and if it be in too small proportion, the syrup quickly ferments, and becomes acescent. The most certain test of the proper consistence of a syrup is its specific gravity, which, when cold, should be 1·385. But, however well prepared, syrups are apt to ferment when kept in a temperature above 60°; and, therefore, the following direction relative to their preservation is given by the London College.

"Let syrups be preserved in a place the temperature of which never exceeds 55°."

SYRUPUS SIMPLEX. Lond. *Syrup.*[1]

"Take of refined sugar, *two pounds and a half*; water, *a pint*. Dissolve the sugar in the water by means of a water-bath; then set it aside for twenty-four hours; take off the scum, and, if there be any fæces, pour off the clear part from them."

SYRUPUS SIMPLEX. Edin. *Simple Syrup.*

"Take of purified sugar, *fifteen parts*; water, *eight parts*. Dissolve the sugar in the water by a gentle heat, and boil it a little so as to form a syrup."

SYRUPI. Dub. *Syrups.*

"In making syrups, for which neither the weight of the sugar nor the mode of dissolving it is specified, the following rule is to be observed:

"Take of refined sugar reduced to a fine powder, *twenty-nine ounces*; the liquor prescribed, *one pint*. Add the sugar by degrees, and digest with a moderate heat, in a close vessel, until it is dissolved, frequently stirring it; set the solution aside for twenty-four hours, take off the scum, and pour off the syrup from the fæces, if there be any."

Simple syrup, when properly prepared, should be inodorous, sweet, thickish, nearly colourless, and perfectly transparent.

SYRUPUS ACETI. Edin. *Syrup of Vinegar.*[2]

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[1] Sirop (*F.*) Einfacher syrup (*G.*) Sciroppo (*I.*)

[2] Syrop d'acide acetique (*F.*) Sciroppo acetico (*I.*)

"Take of vinegar, *five parts*; refined sugar, *seven parts.* Boil, so as to form a syrup."

This syrup is very liable to undergo decomposition: it should, therefore, be made in small quantities only at a time. It may be used for sweetening barley-water or gruels, in fevers and inflammatory diseases.

SYRUPUS ALLII. Dub. *Syrup of Garlic.*

"Take of garlic root (bulb) sliced, *a pound*; boiling water, *two pints.* Macerate the garlic in the water, in a covered vessel, for twelve hours; then let the sugar be added to the strained liquor, and a syrup formed."

This is a very disagreeable syrup; but contains the virtues of the garlic in a sufficient degree to entitle it to some attention.

SYRUPUS ALTHÆÆ. Lond. *Syrup of Marsh Mallows.*[1]

"Take of fresh marsh mallow root bruised, *half a pound*; refined sugar, *two pounds*; water, *four pints.* Boil down the water with the marsh mallow root to one half, and express the liquor when it is cold. Set it aside for twenty-four hours, that the fæces may subside; then decant off the clear liquor, and, having added to it the sugar, boil down to a proper consistence."

SYRUPUS ALTHÆÆ OFFICINALIS. Edin. *Syrup of Marsh Mallows.*

"Take of fresh root of marsh mallows sliced, *one part*; water, *ten parts*; refined sugar, *four parts.* Boil the water with the root down to one half, and, expressing it strongly, strain. Put aside the strained liquor, and, when the fæces have subsided, add to it the sugar; then boil so as to form a syrup."

This is a solution of vegetable mucus and syrup, and is thence supposed to possess demulcent properties; but these are very trivial; and owing to the small proportion of sugar it contains, it very soon suffers spontaneous decomposition.

SYRUPUS AURANTIORUM. Lond. *Syrup of Oranges.*[2]

"Take of fresh orange-peel, *two ounces*; boiling water, *a pint*; refined sugar, *three pounds.* Macerate the bark in the water for twelve hours in a covered vessel; then pour off the liquor, and add to it the sugar."

SYRUPUS CITRI AURANTII. Edin. *Syrup of Orange.*

"Take of fresh peel of Seville oranges, *three ounces*; boiling water, *one pound and a half*; refined sugar, *three pounds.* Macerate the bark in the water in a covered vessel for twelve hours; then add the sugar to the strained liquor, and expose it to a gentle heat so as to form a syrup."

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[1] Sirop d'Althea (*F.*) Althee syrup (*G.*) Sciroppo d'Altea (*I.*)

[2] Sirop d'ecorce d'orange (*F.*) Pomeranzenschaleusyrup (*G.*) Sciroppo di Corteccia di Arancio (*I.*)

SYRUPUS AURANTII. Dub. *Syrup of Orange.*

"Take of the fresh peel of Seville oranges, *eight ounces*; boiling water, *six pints.* Macerate for twelve hours in a covered vessel, and dissolve as much sugar in the filtered liquor as will form a syrup."

The quantity of water ordered by the Edinburgh College is too great; particularly as the application of a degree of heat sufficient to evaporate part of it would dissipate also the flavour of the orange-peel, for which the syrup is chiefly valued. A syrup equally agreeable and efficacious may be made by adding f℥j. of tincture of orange-peel to a pint of simple syrup.

SYRUPUS COLCHICI AUTUMNALIS. Edin. *Syrup of Meadow Saffron.*

"Take of fresh meadow saffron root (bulb) cut into thin slices, *one ounce*; distilled vinegar, *sixteen ounces*; refined sugar, *twenty-six ounces.* Macerate the root in the acid for two days, shaking the vessel occasionally; then expressing gently, strain the liquor, and to it add the sugar; lastly, boil a little so as to form a syrup."

With the substitution of syrup for honey, this preparation is similar to the oxymel. The dose is f℥ij, increased gradually to f℥j or more.

SYRUPUS CROCI. Lond. *Syrup of Saffron.*[1]

"Take of saffron, *an ounce*; boiling water, *a pint*; refined sugar, *two pounds and a half.* Macerate the saffron in the water for twelve hours, in a slightly covered vessel; then filter the liquor, and add to it the sugar."

This syrup is cordial in a small degree; but it is chiefly valued on account of its beautiful colour.

SYRUPUS DIANTHI CARYOPHYLLI. Edin. *Syrup of the Clove July Flower.*

"Take of recent petals of the clove July flower, freed from their claws, *one part*; boiling water, *four parts*; refined sugar, *seven parts.* Macerate the petals in the water for twelve hours; then add the sugar to the strained liquor, and dissolve it with a gentle heat."

SYRUPUS CARYOPHYLLI RUBRI. Dub. *Syrup of Clove July Flower.*

"Take of fresh petals of the clove July flower, freed from the claws, *two pounds*; boiling water, *six pints*. Macerate for twelve hours in a glass vessel; and dissolve a sufficient quantity of sugar in the strained liquor to make a syrup."

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[1] Sirop de Saffran (*F.*) Safransyrup (*G.*)

This syrup is valued for the rich colour, and the agreeable flavour of the flowers, which it possesses in perfection when well prepared. Alkalies change the colour to green, and form a test of the genuineness of the syrup; for they do not produce this effect on a counterfeit syrup, made of an infusion of cloves and coloured with cochineal, which is sometimes sold for it; but the one is as good as the other.

SYRUPUS LIMONUM. Lond. *Syrup of Lemon.*[1]

"Take of strained lemon-juice, *a pint*; refined sugar, *two pounds*. Dissolve the sugar in the lemon-juice, in the manner directed for syrup."

SYRUPUS CITRI MEDICÆ. Edin. *Syrup of Lemons.*

"Take of lemon-juice, strained after the fæces have subsided, *three parts*; refined sugar, *five parts*. Dissolve the sugar."

SYRUPUS LIMONIS. Dub. *Syrup of Lemon.*

"Take of expressed lemon-juice, *two pints*. As soon as the fæces have subsided put it into a mattrass, and immerse it in boiling water for a quarter of an hour; when cold, strain it through a sieve, and make it into a syrup."

This is an agreeable syrup for acidulating barley water or other drinks in febrile diseases. It is also an useful adjunct to gargles in inflammatory sore-throat.

SYRUPUS MORI. Lond. *Syrup of Mulberry.*[2]

"Take of strained mulberry juice, *a pint*; refined sugar, *two pounds*. Dissolve the sugar in the mulberry juice in the manner ordered for syrup."

This syrup is used for the same purposes as the syrup of lemons, and has besides the advantage of colour.

SYRUPUS OPII. Dub. *Syrup of Opium.*[3]

"Take of the watery extract of opium, *eighteen grains*; boiling water, *eight ounces*. Macerate until the opium be dissolved; then add sugar so as to make a syrup."

The watery extract of opium contains the virtues of the opium, without its stimulant qualities. Each ounce of this syrup contains gr. j. of the watery extract. It is a useful anodyne for allaying the irritation which keeps up the cough in catarrh after the inflammatory symptoms are abated, and for procuring sleep, in the diseases of children.

SYRUPUS PAPAVERIS. Lond. *Syrup of Poppy.*[4]

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[1] Zitronensaftsyrup (*G.*)

[2] Maulbeersyrup (*G.*)

[3] Sirop d'opium (*F.*) Opiumsyrup (*G.*) Sciroppo di oppio (*I.*)

[4] Sirop de Pavot blanc (*F.*) Sciroppo di Papaveri bianchi (*I.*)

"Take of the dried capsules of the poppy bruised and freed from the seeds, *fourteen ounces*; refined sugar, *two pounds*; boiling water, *two gallons and a half.* Macerate the capsules in the water for twelve hours; then boil it down in a water-bath to one gallon, and express strongly. Boil the liquor again down to two pounds, and strain it while it is hot. Set it aside twelve hours that the fæces may subside; then boil down the clear liquor to one pint, and add the sugar, in the manner ordered for making syrup."

Syrupus Papaveris somniferi. Edin. *Syrup of White Poppy.*

"Take of the capsules of the white poppy dried, and freed from the seeds, *one part*; boiling water, *fifteen parts*; refined sugar, *two parts.* Macerate the sliced capsules in the water for twelve hours; then boil until a third part only of the liquor remains; and expressing strongly, strain the decoction. Boil the strained liquor to one half, and again strain it; lastly, having added the sugar, boil it for a short time, so as to form a syrup."

Syrupus Papaveris albi. Dub. *Syrup of White Poppies.*

"Take of the capsules of the white poppy, gathered before they are ripe, dried, and freed from the seeds, *a pound*; boiling-water, *three pints.* Slice and bruise the capsules; then pour over them the water, and macerate for twelve hours; express the liquor, and evaporate it by a gentle heat to a pint; strain through a thin linen cloth, and set it aside six hours that the fæces may subside; finally, add sugar to the clear liquor that it may make a syrup."

The narcotic principle of the poppy is taken up by the water, but it is very probable that any variation of the degree of heat necessary to produce the evaporation, will alter in a considerable degree the nature of the extract, and must consequently make the syrup differ in point of strength. It ferments more readily than most other syrups, but loses its narcotic property when it becomes acescent. One fluid ounce of it contains about one grain of extract.

Medical properties and uses. — Syrup of poppy is an useful anodyne for allaying the violence of the cough in catarrh, for easing pain, and procuring sleep in children's diseases. The dose is from fʒj. to f℥j. according to the age of the patient.

SYRUPUS RHŒADOS. Lond. *Syrup of the Red Poppy.*[1]

"Take of the recent petals of the red poppy, *a pound*; boiling water, *a pint and two fluid ounces*; refined sugar, *a pound and a half.* To the water, heated in a water bath, add gradually the petals of the red poppy, stirring them occasionally; then, having removed the vessel, macerate for twelve hours; press out the liquor, and set it aside that the impurities may subside; lastly, add the sugar in the manner directed for making syrup.

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[1] Sirop de Coquelicot (*F.*) Klatschrosen syrup (*G.*)

SYRUPUS PAPAVERIS ERRATICI. Dub. *Syrup of the Red Poppy.*

"Take of the fresh petals of the red poppy, *a pound*; boiling water, *twenty fluid ounces.* Add the flowers gradually to the boiling water; then, having removed the vessel from the fire, macerate in a lower heat for twelve hours; express the liquor, and set it aside that the fæces may subside; finally, let the sugar be added so as to make a syrup."

By attending strictly to the directions of either of the above formulæ, the petals yield their fine rich colour, for which alone the syrup is valued.

SYRU'PUS RHAM'NI.[1] Lond. *Syrup of Buckthorn.*

"Take of the fresh juice of buckthorn berries, *four pints*; ginger root sliced, pimenta berries bruised, of each *half an ounce*; refined sugar, *three pounds and a half.* Set apart the juice for three days that the fæces may subside, and strain it. To the strained juice add the ginger root, and pimenta berries; then macerate by a gentle heat for four hours and strain. Boil the remainder of the juice down to a pint and a half; mix the liquors, and add the sugar in the manner directed for making syrup."

SYRUPUS RHAMNI CATHARTICI. Edin. *Syrup of Buckthorn.*

"Take of the clarified juice of ripe buckthorn berries, *two parts*; refined sugar, *one part.* Boil so as to form a syrup."

Of these two formulæ, that of the London College is to be preferred, as the addition of the ginger and all-spice tends to cover the unpleasant taste of the buckthorn juice, and prevent the violent griping which it is apt to induce. It is a brisk cathartic; but owing to the unpleasantness of its operation, and the dryness of the mouth and fauces it occasions, it is seldom used, except as a horse medicine. The dose is from fʒſs. to f℥j. drinking freely of tepid demulcent fluids during its operation.

SYRU'PUS RO'SÆ.[2] Lond. *Syrup of Roses.*

"Take of the petals of the hundred-leaved rose dried, *seven ounces*; refined sugar, *six pounds*; boiling water, *four pints.* Macerate the rose petals in the water for twelve hours, and strain. Evaporate the strained liquor in a water-bath down to *two pints and a half*; then add the sugar so as to make a syrup."

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[1] Syr. de Spina cervina, P. L. 1720. Syrupus Spinæ cervinæ, P. L. 1787.

[2] Syr. e Rosis siccis, P. L. 1720. Syr. Rosarum solutivus, P. L. 1745.

Syrupus Rosæ centifoliæ. Edin. *Syrup of Damask Roses.* "Take of the fresh petals of the damask rose, *one part*; boiling water, *four parts*; refined sugar, *three parts.* Macerate the petals in the water for twelve hours; then add the sugar to the strained liquor, and boil, so as to form a syrup."

This syrup has none of the agreeable odour of the rose, but possesses weak purgative properties; on which account it is given as a laxative in very weak habits, and to infants. The dose is from fʒij. to fʒxij. or more.

SYRUPUS ROSÆ GALLICÆ. Edin. *Syrup of Red Roses.*[1]

"Take of the petals of the red rose dried, *one part*; boiling water, *nine parts*; refined sugar, *ten parts.* Macerate the petals in the water for twelve hours; then boil a little, and strain. Add the sugar to the strained liquor, and again boil a little, so as to form a syrup."

This syrup is a very weak astringent; and as such is added to astringent and stomachic infusions and gargles; but it is chiefly valued on account of its flavour and colour.

SYRUPUS SCILLÆ MARITIMÆ. Edin. *Syrup of Squill.*[2]

"Take of vinegar of squill, *four parts*; refined sugar powdered, *seven parts.* Dissolve the sugar by a gentle heat, so as to make a syrup."

This syrup has the same properties, and is employed for the same purposes, as the oxymel of squill. The dose is from fʒj. to fʒij. given in any aromatic distilled water.

SYRU'PUS SEN'NÆ. Lond. *Syrup of Senna.*

"Take of senna leaves, *two ounces*; fennel seeds bruised, *an ounce*; manna, *three ounces*; refined sugar, *a pound*; boiling water, *a pint.* Macerate the senna leaves and the fennel seeds in the water in a gentle heat for twelve hours; strain the liquor, mix with it the manna and the sugar; and boil to a proper consistence."

Syrupus Cassiæ Sennæ. Edin. *Syrup of Senna.*

"Take of senna leaves *two ounces*; boiling water, *a pound and a half*; burnt syrup *eight ounces.* Macerate the leaves in the water in a covered vessel for four hours, and strain; then add the syrup, and boil with a gentle heat until the whole acquires the consistence of the burnt syrup.

Dublin.

"Take of manna, refined sugar, of each *a pound*; senna leaves, *half an ounce*; boiling water, *a pint*. Let the senna leaves be macerated in the water in a covered vessel for twelve hours; then dissolve the manna and the sugar in the strained liquor."

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[1] Sirop de Roses rouges (*F.*) Rosen syrup (*G.*) Sciroppo di Rose Rosse (*I.*)

[2] Sirop aceteux de Scille (*F.*) Sciroppo di Squilla marino acetoso (*I.*)

This syrup contains the purgative properties of the senna, and is chiefly intended for children; but the simple infusion of senna, sweetened with sugar, and with the addition of a little milk, given in the form of tea, is more willingly taken by children, and operates with more certainty.

SYRU'PUS TOLUTA'NUS. Lond. *Syrup of Tolu.*[1]

"Take of balsam of Tolu, *an ounce*; boiling water, *a pint*; refined sugar, *two pounds*. Boil the balsam in the water for half an hour in a close vessel, frequently stirring it, and strain the liquor when it is cold; then add the sugar so as to make a syrup."

SYRUPUS TOLUIFERA BALSAMI. Edin. *Syrup of Tolu.*

"Take of simple syrup, *two pounds*; tincture of balsam of Tolu, *one ounce*. To the syrup immediately after it is made, and before it is quite cold, add the tincture gradually, and with frequent stirring."

By following the London formula a more elegant and grateful syrup is obtained than that produced by the Edinburgh method, and which owes its qualities to the benzoic acid of the balsam; but the syrup ordered by the Edinburgh College is sufficient for all the uses to which it can be applied. It is whitish and turbid, owing to a partial decomposition of the tincture, which deposits its resin when mixed with the syrup. Its only use is to give a pleasant flavour to disagreeable draughts and mixtures.

SYRUPUS VIOLÆ ODORATÆ. Edin. *Syrup of Violet.*[2]

"Take of flowers of the odorous violet, *two parts*; boiling water, *eight parts*; refined sugar, *fifteen parts*. Macerate the flowers in the water for twenty-four hours, in a covered glass or glazed earthenware vessel; then strain without expression, and add the sugar."

SYRUPUS VIOLÆ. Dub. *Syrup of Violet.*

"Take of the fresh petals of the violet, *two pounds*; boiling water, *five pints*. Macerate for twenty-four hours; then strain the liquor through fine linen with expression; and add a sufficient quantity of sugar to make a syrup."

This syrup has a deep blue colour, and a very agreeable flavour. The colour, however, which constitutes its chief value, is apt to suffer by keeping; and, hence, the syrup is often counterfeited with materials, the colour of which is more permanent, and which are more easily obtained. This fraud is easily detected by adding a little acid or alkali to a portion of the suspected syrup: if it be genuine, the acid will change the blue colour to red, and the alkali to green; but if it be counterfeit, these changes will not take place.

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[1] Syr. balsamicus, P. L. 1720. Syrop Balsamique (*F.*)

[2] Sirop de Violettes (*F.*) Violensyrups (*G.*) Sciroppo di Viole (*I.*)

Medical properties and uses.—This syrup acts as a gentle laxative when given to infants; but it is chiefly used as a test of the presence of acids and alkalies.

SYRUPUS ZINGIBERIS. Lond. *Syrup of Ginger.*[1]

"Take of ginger root sliced, *two ounces*; boiling water, *a pint*; refined sugar, *two pounds.* Macerate the ginger root in the water for four hours, and strain; then add the sugar so as to make a syrup."

Dublin.

"Take of ginger root bruised, *four ounces*; boiling water, *three pints.* Macerate for twenty-four hours; then strain the liquor, and add sugar so as to make a syrup."

SYRUPUS AMOMI ZINGIBERIS. Edin. *Syrup of Ginger.*

"Take of ginger root powdered, *six drachms*; boiling water, *one pound*; refined sugar, *twenty-two ounces.* Macerate the root in the water, in a covered vessel, for twenty-four hours; then add the sugar to the strained infusion, and dissolve by a gentle heat."

This syrup is moderately stimulant and carminative; and is an useful adjunct to bitter and tonic infusions.

Officinal preparations. *Electuarium Catechu.* D. *Electuarium opiatum.* E.

CONFECTIONES.

CONFECTIONS.

UNDER this title the London College comprehends the *Conserves* and *Electuaries* of its former Pharmacopœia, and of the present Edinburgh and Dublin Pharmacopœias. There is, however, a distinction between confections or conserves and electuaries, which prevents them in strict propriety from being classed together; and which we shall point out, although at the same time we adhere to the title of the London College.

CONFECTIONS or CONSERVES consist of fresh vegetable matters beat into an uniform mass with refined sugar. They are designed to preserve as nearly as possible unaltered the virtues or properties of recent vegetables; and to prevent the decomposition to which they would otherwise be liable: and although several delicate flowers and fruits and juicy plants can be well preserved by this means, yet this form of preparation is not adapted for all plants; and in almost all cases the active ingredients are injured by keeping in this form. As remedies, confections scarcely ever possess great activity; and are chiefly useful as vehicles for the exhibition of more active substances. They should be kept in closely covered jars, in order to preserve their proper degree of moisture.

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[1] Sirop de Gingembre (*F.*) Sciroppo d' Amomo Zenzero (*I.*)

ELECTUARIES are mixtures of vegetable and light earthy powders, combined by means of honey or syrup so as to form masses of a moderate consistence. All substances of this description may, therefore, be made into electuaries; but as the intention of this form of preparation is to render remedies as palatable as possible, those matters only can be employed to form electuaries, the taste of which is not too ungrateful to be covered by syrup or honey. They are more active remedies than conserves; but still the more powerful vegetable substances cannot well be exhibited in this form, on account of their taste; and the metallic salts are too ponderous to remain suspended in either syrup or honey. In making electuaries, the degree of consistence must always be regulated by the nature of the substances which enter into them.

" In conserves," as Mr. Murray justly observes, " the addition of the saccharine matter is in much larger proportion, and is designed to preserve the vegetable matter; in electuaries, the syrup is designed merely to communicate the required form."

The following general rule is given by the London College for restoring the consistence of confections and electuaries, when they have become hard by keeping:

" If confections have become hard from long keeping, they are to be moistened with water, so as to restore their proper consistence."

CONFECTIO AMYGDALARUM. Lond. *Confection of Almonds.*

" Take of sweet almonds, *an ounce*; acacia gum in powder, *a drachm*; refined sugar, *half an ounce*. Macerate the almonds in water to free them from their cuticle, then beat all the ingredients together, until they be thoroughly incorporated."

This preparation is introduced as affording an easy and expeditious mode of preparing the almond mixture, the extemporaneous preparation of which is tedious. A little of this paste, triturated with a sufficient portion of water, immediately forms an emulsion.

CONFECTIO AROMATICA. Lond. *Aromatic Confection.*[1]

"Take of cinnamon bark, nutmegs, of each *two ounces*; cloves, *an ounce*; cardamom seeds, *half an ounce*; saffron dried, *two ounces*; prepared shells, *sixteen ounces*; refined sugar powdered, *two pounds*; water, *a pint.* Rub the dry substances mixed together into a very fine powder; then add the water gradually, and mix until the whole be thoroughly incorporated."

ELECTUARIUM AROMATICUM. Edin. *Aromatic Electuary.*

"Take of the aromatic powder, *one part*; syrup of orange, *two parts.* Mix and beat them well together so as to form an electuary."

Dublin.

"Take of cinnamon bark, nutmegs, of each *half an ounce*; refined sugar, saffron, of each *an ounce*; lesser cardamom seeds husked, cloves, of each *two drachms*; precipitated chalk, *two ounces*; syrup of orange, *a sufficient quantity.* Reduce the aromatics separately to powder, and then mix them with the syrup."

These combinations of aromatics are stimulant, and cordial. They are given with advantage in typhoid fevers, atonic gout, and nervous languors; either alone in the form of bolus, or combined with camphor and syrup of orange-peel, in the form of mixture. The dose is from gr. x. to ʒj. or more.

CONFECTIO AURANTIORUM. Lond. *Confection of Oranges.*

"Take of the external rind of the fresh orange, separated by rasping, *a pound*; refined sugar, *three pounds.* Beat the rind in a stone mortar with a wooden pestle; then add the sugar, and continue the beating until they be thoroughly incorporated."

CONSERVA AURANTII. Dub. *Conserve of Orange.*

"To the rind of Seville orange, rasped off, add three times its weight of refined sugar, while beating it."

CONSERVA CITRI AURANTII. Edin. *Conserve of Orange.*

"Grate off the exterior rind of Seville oranges, beat it into a pulp, and during the beating add gradually three times its weight of refined sugar."

This confection is gently stomachic, and is a pleasant vehicle for the exhibition of tonic powders.

CONFECTIO CASSIÆ. Lond. *Confection of Cassia.*

"Take of fresh cassia pulp, *half a pound*; manna, *two ounces*; tamarind pulp, *an ounce*; syrup of roses, *half a pound.*

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[1] Electuare Aromatique (*F.*) Gewürzlatwerge (*G.*) Elettuario Aromatico (*I.*)

Bruise the manna; then dissolve it in the syrup, by the heat of a water bath, and, having mixed in the pulp, evaporate down to a proper consistence."

ELECTUARIUM CASSIÆ FISTULÆ. Edin. *Electuary of Cassia.*

"Take of cassia pulp, *four parts*; tamarind pulp, manna, of each *one part*; syrup of damask roses, *four parts.* Bruise the manna in a mortar, and dissolve it in the syrup, by means of a gentle heat; then add the pulps, and by a continued heat reduce the mixture to a proper consistence."

ELECTUARIUM CASSIÆ. Dub. *Electuary of Cassia.*

"Take of fresh extracted cassia pulp, *half a pound*; manna, *two ounces*; tamarind pulp, *an ounce*; syrup of orange, *half a pound.* Bruise the manna, then dissolve it in the syrup by means of a moderate heat, and add the pulp; lastly, evaporate slowly the mixture to a proper consistence."

This electuary is gently laxative, and is used to relieve habitual costiveness; as a purge for children; and as a vehicle for the exhibition of other more powerful purgatives. Although it appears, *a priori*, to be of a nature apt to ferment and become acescent, yet it may be kept for six months without undergoing any very particular change.

CONFECTIO OPII. Lond. *Confection of Opium.*[1]

"Take of hard opium powdered, *six drachms;* long pepper, *an ounce;* ginger root, *two ounces;* carraway seeds, *three ounces;* syrup, *a pint.* Rub the opium with the syrup made hot, then add the remaining articles reduced to powder, and mix."

ELECTUARIUM OPIATUM; olim, ELECTUARIUM THEBAICUM. Edin. *Opiate Electuary;* formerly, *Thebaic Electuary.*

"Take of aromatic powder, *six ounces;* Virginian snakeroot, in fine powder, *three ounces;* opium, diffused in a sufficient quantity of Spanish white wine, *half an ounce;* syrup of ginger, *a pound.* Mix, so as to make an electuary."

The operation of the opium, which is the most important ingredient in these preparations, is modified by the aromatics. They are intended as substitutes for the *mithridate* and *theriaca* of the old pharmacopœias, which were too long allowed to disgrace modern pharmacy. They are stimulant narcotics; and are usefully employed in atonic gout, flatulent colic, and in diarrhœas, unattended by any inflammatory symptoms. Thirty-six grains of the London confection contain one grain of opium, and the same quantity is contained in forty-three of the Edinburgh electuary. The dose is from grs. x. to fʒj. given in the form of bolus, or diffused in the chalk mixture.

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[1] Electuaire Opiate (*F.*) Theriaklatwerge (*G.*) Elettuario Oppiato (*I.*)

ELECTUARIUM CATECHU COMPOSITUM. Edin. *Compound Electuary of Catechu.*

"Take of extract of catechu, *four ounces*; kino, *three ounces*; cinnamon bark, nutmegs, of each *one ounce*; opium, diffused in a sufficient quantity of Spanish white wine, *a drachm and a half*; syrup of red roses boiled to the thickness of honey, *two pounds and a quarter.* Reduce the solid ingredients to powder; then mix them with the opium and syrup, so as to form an electuary."

Dublin.

"Take of catechu, *four ounces*; cinnamon bark, *two ounces*; kino, *three ounces*; rub them to powder, and add, of hard refined opium diffused in Spanish white wine, *a drachm and a half*; syrup of ginger boiled to the consistence of honey, *two pounds and a quarter.* Mix them."

These are useful combinations of astringents and aromatics; and may be efficaciously given in diarrhœas, and the last stage of dysentery, either in the form of bolus, or diffused in some distilled water. The dose is from ℈j. to ʒij. Ten scruples contain one grain of opium.

CONFECTIO ROSÆ CANINÆ. Lond. *Confection of the Dog Rose.*[1]

"Take of pulp of the dog-rose, *a pound*; refined sugar, in powder, *twenty ounces.* Rub them together until they be well incorporated."

Edinburgh.

"Take of the fresh fruit of the dog-rose, carefully freed from the seeds and inclosed spiculæ, beat it to a pulp, and while beating add gradually three times its weight of double refined sugar."

CONFECTIO ROSÆ GALLICÆ. Lond. *Confection of the Red Rose.*[2]

"Take of the unblown petals of the red rose, freed from the claws, *a pound*; refined sugar, *three pounds.* Beat the petals in a stone mortar; then add the sugar, and beat again until the whole be thoroughly incorporated."

Edinburgh.

"Beat the unblown petals of the red rose to a pulp; and add during the beating three times their weight of refined sugar."

CONSERVA ROSÆ. Dub. *Conserve of Roses.*

"Beat the unblown petals of the red rose, freed from their claws; adding gradually three times their weight of refined sugar."

The confection of the red rose possesses a small degree of astringency, and is sometimes given dissolved in new milk, as a tonic in early convalescence from acute diseases; but the chief use of the confections of both kinds of roses, is to form pleasant vehicles for more active remedies.

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[1] Conserva Fructus Cynosbati, P. L. 1745. Conserva Cynosbati, P. L. 1787.

[2] Conserva Rosarum rubrarum, P. L. 1720. Conserva Rosæ, P. L. 1787. Conserve de Roses rouges (*F.*) Rosenconserve (*G.*) Conserva di Rose rosse (*I.*)

CONFEC'TIO RUTÆ. Lond. *Confection of Rue.*[1]

"Take of rue leaves dried, carraway seeds, laurel berries, of each *an ounce and a half*; segapenum, *half an ounce*; black pepper, *two drachms*; clarified honey, *sixteen ounces*. Rub the dry articles together to a very fine powder; then add the honey, and mix the whole together."

This electuary, we are informed, is introduced as a substitute for the old *Bay Berry Electuary*. It possesses some antispasmodic powers; but is used in the form of enema only; from ℈j. to ʒj. dissolved in Oſs. of gruel, being administered in the convulsive affections of infants, and flatulent colic.

CONFECTIO SCAMMONEÆ.[2] Lond. *Confection of Scammony.*

"Take of scammony powdered, *an ounce and a half*; cloves bruised, ginger root powdered, of each *six drachms*; oil of carraway, *half a drachm*; syrup of roses, *a sufficient quantity*. Rub the dry substance into a very fine powder; then add gradually the syrup, and rub them again: lastly, after adding the oil of carraway, mix the whole together."

ELECTUARIUM SCAMMONII. Dub. *Electuary of Scammony.*

"Take of scammony, ginger root, of each reduced to powder, *an ounce*; oil of cloves, *a scruple*; syrup of orange, *a sufficient quantity*. Mix the ginger in powder with the syrup of orange, then add the scammony, and lastly the oil."

This is a stimulating cathartic; and may be given in a dose of from fʒſs. to fʒj. but it is seldom ordered."

CONFEC'TIO SEN'NÆ.[3] Lond. *Confection of Senna.*

"Take of senna leaves, *eight ounces*; figs, *a pound*; tamarind pulp, cassia pulp, the pulp of prunes, of each *half a pound*; coriander seeds, *four ounces*; liquorice root, *three ounces*; refined sugar, *two pounds and a half*. Powder the senna leaves with the coriander seeds, and separate by sifting ten ounces of the mixed powder. Boil the residue with the figs and liquorice root, in four pints of water, until it be reduced one half; then press out and strain the liquor. Evaporate the strained liquor in a water-bath, until a pint and a half only remains of the whole; then the sugar being added, make a syrup. Finally, mix gradually the pulps with the syrup; and having added the sifted powder, mix the whole together."

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[1] Electuarium è Baccis Lauri, P. L. 1720.

[2] Electuarium caryocostinum, P. L. 1720. Electuarium e scammonio, P. L. 1745. Electuarium scammoni, P. L. 1787.

[3] Electuarium lenitivum, P. L. 1720. Electuarium Sennæ, P. L. 1787.

ELECTUARIUM SENNÆ COMPOSITUM. *Compound Electuary of Senna.*

"Take of senna leaves, *eight ounces*; coriander seeds, *four ounces*; liquorice root bruised, *three ounces*; figs, pulp of prunes, of each *a pound*; pulp of tamarinds, *half a pound*; refined sugar, *two pounds and a half*; water, *four pounds.* Rub the senna with the coriander, and separate by sifting ten ounces of the mixed powder. Boil the residue with the figs and liquorice root, in the water, down to one half; then express and strain. Evaporate the strained liquor to about a pound and a half. Add the sugar, and gradually the pulps; and lastly, mix in the powder."

ELECTUARIUM SENNÆ. Dub. *Electuary of Senna.*

"Take of senna leaves, in very fine powder, *four ounces*; pulp of prunes, *a pound*; pulp of tamarinds, *two ounces*; molasses, *one pint and a half*; essential oil of carraway, *two drachms.* Boil the pulps with the syrup, to the thickness of honey; then add the powder, and, when the mixture is nearly cold, the oil; finally, mix the whole thoroughly together."

Any of these electuaries is a mild and pleasant purgative, and well adapted for those who are afflicted with habitual costiveness; and for pregnant women. The dose is from ʒj. to ʒiv. or more, taken at bed time.

PULVERES.

POWDERS.

THIS form of preparing medicines is the simplest, and perhaps the least objectionable; but it is not applicable to all the articles of the materia medica. Those remedies, which are very unpleasant to the taste; those which deliquesce rapidly when exposed to the air, or are very volatile; and those which require to be given in large doses, or which are not diffused readily in water, cannot with propriety be administered in the form of powder. Some substances cannot be reduced to powder, unless they be very much dried; and the heat necessary for that purpose alters their properties; even the impalpable form given to powders is injurious to some resinous substances; and we cannot be surprised that a great alteration should be effected in a short time, by the action of the air, on so great an extension of surface as takes place in the operation usually adopted for reducing drugs to fine powder. *Cinchona*, *rhubarb*, *ipecacuanha*, and *guaiacum*, operate much less powerfully in the state of impalpable powder, than when reduced to that degree of fineness only, which can be effected by simply beating them in a mortar, and passing them through a coarser sieve, than is employed in the former case.

As powders are generally affected by the action of air and light, all powders should be kept in opaque or green glass bottles. The effect of light on the majority of powders is rendered obvious by the labelled sides of clear bottles containing them, which are always turned to the light, becoming encrusted with the powder changed in its colour, while the other side remains clear and transparent.

In forming compound powders, it is necessary to sift the mixture after it has been well triturated. The following general rule for the formation of powders is given by the Dublin College. "Let the substances to be powdered be first dried[1]; and then beaten in an iron mortar; then separate the finer powder by shaking it through a hair sieve, and preserve it in close vessels."

PUL'VIS AL'OES COMPOS'ITUS. Lond. *Compound Powder of Alöes.*[2]

"Take of extract of spiked alöes, *an ounce and a half*; guaiac gum-resin, *an ounce*; compound powder of cinnamon, *half an ounce.* Powder the extract of alöes and the guaiac separately; then mix them with the compound powder of cinnamon."

PULVIS ALÖES CUM GUAIACO. Dub. *Powder of Alöes with Guaiac.*

"Take of hepatic alöes, *an ounce and a half*; guaic gum-resin, *an ounce*; aromatic powder, *half an ounce.* Rub the alöes and the guaiac separately to powder; then mix them with the aromatic powder."

Both the active substances in these powders are ill adapted for this form of preparation; and the addition of the aromatic sufficient to cover the nauseous taste of the alöes. They are warm sudorific cathartics, and may be given in doses of from gr. x. to ℈j. but are seldom ordered.

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[1] Mr. Battley, a respectable druggist in London, has proposed the following method of drying narcotic plants for powders.

Previous to the process of drying the leaves of plants, the same rules must be carefully observed in reviving them which were recommended previous to their being pressed for extracts.

The leaves being in a high state of preservation, and entirely freed from the stalks, and as much as possible from external moisture, must be laid in thin layers in baskets of willow stripped of its bark, in a drying room, from which the light is quite excluded. They should be then exposed to a temperature of not less than from 130 to 140 deg. of Fahrenheit's thermometer for three or four hours, or until the leaves begin to shrivel. They are then to be turned in the same temperature, and the heat kept up for six or eight hours longer, when the operation is generally finished; which is known by the leaves crumbling without much difficulty in the hand. If the process has been in all its parts properly managed, the result will be, that the leaves retain a beautiful green colour, and also in a high degree the medical properties of the plant to which they belong.

To preserve them in this desirable state, oil jars, made perfectly clean and dry, are found to answer best. Place the leaves lightly in the jars, and hermetically seal them. The filled jars ought to be kept in a dry and warm situation.

[2] Pilulæ de Diambræ, P. L. 1720. Pulvis Aloës cum Guaiaco, P. L. 1787.

PULVIS ALOES CUM CANELLA. Dub. *Powder of Alöes with Canella.*

" Take of hepatic aloes, *a pound*; white canella, *three ounces.* Rub them separately to powder, and then mix them."

This powder is liable to the same objection as the former, although the canella covers the taste better than the aromatic powder. It has been long known in the shops under the name of *Hiera Picra;* and is used as a domestic remedy, infused in wine or spirits. From grs. x. to ℈j. may be given for a dose.

PULVIS ASARI COMPOSITUS. Edin. *Compound Powder of Asarabacca.*

" Take of the leaves of asarabacca, *three parts*; the leaves of marjoram, flowers of lavender, of each *one part.* Rub them together to a powder."

Dublin.

" Take of dried leaves of asarabacca, *an ounce*; lavender flowers dried, *two drachms.* Rub them together to a powder."

A few grains of this powder snuffed up the nostrils for several successive evenings at bed-time, excite sneezing and a copious discharge of mucus, which continues to flow on the succeeding days. It has been particularly used in tooth-ach and chronic ophthalmia.

PUL'VIS CINNAMO'MI COMPOS'ITUS. Lond. *Compound Powder of Cinnamon.*[1]

" Take of cinnamon bark, *two ounces*; cardamom seeds, *an ounce and a half*; ginger root, *an ounce*; long pepper, *half an ounce.* Rub them together to a very fine powder."

PULVIS AROMATICUS. Edin. *Aromatic Powder.*

" Take of cinnamon bark, cardamom seeds, ginger root, of each *equal parts.* Rub them to a very fine powder, which is to be preserved in a well stopped phial."

Dublin.

" Take of cinnamon bark, *an ounce*; lesser cardamom seeds freed from the husks, ginger, long pepper, of each *an ounce.* Rub them together to a powder."

These combinations of aromatics are stimulant and carminative, and may be used to promote digestion, and expel flatus in cold phlegmatic habits; but they are more generally employed to give warmth to other compositions. The dose is from gr. viij. to ℈j. given in the form of bolus, or diffused in water.

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[1] Species Diambræ sine odoratis, P. L. 1720. Species aromaticæ, P. L. 1745. Pulvis aromaticus, P. L. 1787. Poudre aromatique (*F.*) Gewurpulver (*G.*) Polvere aromatica (*I.*)

Officinal preparations. *Pulvis Aloës compositus.* L. D. *Electuarium aromaticum.* E. *Electuarium opiatum.* E.

PUL'VIS CONTRAYER'VÆ COMPOS'ITUS. Lond. *Compound Powder of Contrayerva.*[1]

"Take of contrayerva root powdered, *five ounces*; prepared shells, *a pound and a half.* Mix them."

This powder is stimulant and sudorific; and is given with advantage in typhoid fevers; the malignant exanthemata; the sinking stage of dysentery; and in atonic gout. The dose is from gr. x. to gr. xl. given either diffused in simple water, or rubbed up with mucilage and mint water.

PULVIS CORNU CERVINI USTI. Dub. *Powder of Burnt Hartshorn.*

"Let pieces of hartshorn be burnt until they become white, then reduce them to a very fine powder."

PUL'VIS COR'NU US'TI CUM O'PIO. Lond. *Powder of burnt Hartshorn with Opium.*[2]

"Take of hard opium powdered, *a drachm*; hartshorn burnt and prepared, *an ounce*; cochineal powder. *a drachm.* Mix them."

PULVIS OPIATUS. Edin. *Opiate Powder.*

"Take of opium, *one part*; prepared carbonate of lime, *nine parts.* Rub them together to a fine powder."

Ten grains of either of these powders contain one grain of opium. They are intended chiefly for exhibiting opium in very small doses. The substances used to divide the opium are of no consequence as to the effect of the remedy; and, therefore, the burnt hartshorn being more brittle than the chalk is better fitted for this purpose.

PULVIS CRETÆ COMPOSITUS. Lond. *Compound Powder of Chalk.*

"Take of prepared chalk, *half a pound*; cinnamon bark, *four ounces*; tormentil root, acacia gum, of each *three ounces*: long pepper, *half an ounce.* Rub them separately to fine powder, then mix them."

PULVIS CARBONATIS CALCIS COMPOSITUS. Edin. *Compound Powder of Carbonate of Lime.*

"Take of prepared carbonate of lime, *four ounces*; cinnamon bark, *a drachm and a half*; nutmegs, *half a drachm.* Rub them together to a powder."

The London preparation, owing to the larger proportion of aromatics it contains, and the addition of the tormentil root, is better adapted for checking diarrhœa connected with acidity of the primæ viæ, than the Edinburgh powder, which may be regarded as a simple but grateful antacid. The dose is from gr. v. to ℈j. given generally in the form of mixture rubbed up with mucilage and some distilled water.

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[1] Lapis Contrajervæ, P. L. 1720, so named from its having been made into balls.

[2] Pulvis opiatus, P. L. 1787. Poudre opiate (*F.*) Opiumspulver (*G.*) Polvere oppiata (*I.*)

PULVIS CRETÆ COMPOSITUS CUM OPIO. Lond. *Compound Powder of Chalk with Opium.*

"Take of compound powder of chalk, *six ounces and a half*; hard opium powdered, *four scruples.* Mix them."

The addition of opium to the compound powder of chalk renders it more useful in diarrhœa; and from the minute division of the opium, one grain only being contained in two scruples of the powder, it forms an useful opiate powder for children suffering under the irritative diarrhœa of teething. The dose is from ℈j. to ʒj. for adults.

PULVIS JALAPÆ COMPOSITUS. Edin. *Compound Powder of Jalap.*

"Take of powder of jalap root, *one part*; supertartrate of potash, *two parts.* Rub them together to a fine powder."

The addition of the supertartrate, besides dividing the jalap very minutely, modifies also its purgative operation. This powder is an useful purgative in habitual costiveness: it is also very serviceable to children with tumid bellies, in worm cases, and in dropsy. The dose is from ℈j. to ℈ij. for adults.

PULVIS IPECACUANHÆ COMPOSITUS. Lond. Dub. *Compound Powder of Ipecacuanha.*[1]

"Take of ipecacuanha root powdered, hard opium powdered, of each *a drachm*; sulphate of potash powdered, *an ounce.* Mix them."

PULVIS IPECACUANHÆ ET OPII. Edin. *Powder of Ipecacuanha and Opium.*

"Take of ipecacuanha root powdered, opium, of each *one part*; sulphate of potash, *eight parts.* Rub them together to a fine powder."

In this powder, the sulphate of potash is intended chiefly to divide the opium mechanically; but it modifies also the action of the opium and ipecacuanha. Compound ipecacuanha powder operates as a powerful sudorific; and is very efficaciously given in acute rheumatism, dropsy, gout, dysentery, and in all cases, whether inflammatory or not, in which full sweating is indicated. The dose is from grs. v. to ℈j. given diffused in water, or in the form of bolus, and assisted by plentiful dilution with tepid fluids; but these must not be drank immediately after taking the powder, as from such a circumstance it is very apt to be rejected by vomiting. Ten grains of this powder contain one grain of opium.

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[1] Poudre d'Ipecacuanha et d'opium (*F.*) Ipekakuanhapulver (*G.*) Polvere d'Ipecacuanha ed oppio (*I.*)

PULVIS KINO COMPOSITUS. Lond. *Compound Powder of Kino.*

"Take of kino, *fifteen drachms*; cinnamon bark, *half an ounce*; hard opium, *a drachm.* Rub them separately to a very fine powder, and then mix."

This is an astringent anodyne powder, now, for the first time, introduced into the Pharmacopœia. The dose is from grs. x. to ℈j. Twenty grains of the powder contain one grain of opium.

PULVIS QUERCUS MARINÆ. Dub. *Powder of Yellow Bladder-wrack.*

"Take of bladder-wrack in flower, *any quantity.* Let it be dried, and freed from the sordes, then exposed to heat in an iron vessel, or a crucible, to which a perforated lid is adapted, until, the vapours ceasing, it becomes obscurely red hot. Reduce the carbonaceous matter which remains, to powder."

This powder is a mixture of soda and charcoal. For its medicinal effects see (*Fucus*, Part ii.)

PULVIS SALINUS COMPOSITUS. Edin. *Compound Saline Powder.*

"Take of pure muriate of soda, sulphate of magnesia, of each *four parts*; sulphate of potash, *three parts.* Dry the salts with a gentle heat, then pulverize them separately, and afterwards rub them together. Preserve the powder in a well stopt phial."

This powder is a simple purgative, and does not appear to possess any peculiar advantages.

PULVIS SCAMMONIÆ COMPOSITUS. Lond. *Compound Powder of Scammony.*[1]

"Take of scammony, hard extract of jalap, of each *two ounces*; ginger root, *half an ounce.* Rub them separately to a very fine powder, and then mix them."

PULVIS SCAMMONII COMPOSITUS. Edin. *Compound Powder of Scammony.*

"Take of scammony, supertartrate of potash, of each *equal parts.* Rub them together to a very fine powder."

These powders, although agreeing in name, differ very considerably in their nature. In the first, the activity and the stimulating quality of the scammony are increased by the jalap, while the griping effect of the mixture is in some degree obviated by the ginger. In the second, the addition of the supertartrate of potash detracts from the violence of the operation of the scammony, and renders it less irritating; although, at the same time, it renders it more certain. The dose of the first is from grs. x. to grs. xv.; that of the second, from grs. x. to ʒſs. They are chiefly used in hydropic and worm cases, and to remove mucous obstructions.

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[1] Poudre de Scammonée composée (*F.*)

PULVIS SCILLÆ. Dub. *Powder of Squill.*

"Let squill roots (bulbs) freed from their membranous integuments and cut in transverse slices, be dried upon a sieve with a low degree of heat; and then reduce it to powder, which must be preserved in well stopped glass phials."

PULVIS SENNÆ COMPOSITUS. Lond. *Compound Powder of Senna.*[1]

"Take of senna leaves, supertartrate of potash of each *two ounces*; scammony, *half an ounce*; ginger-root, *two drachms.* Reduce to very fine powder, the scammony by itself, and the other ingredients together; then mix the whole."

This powder is hydragogue and cathartic; but it is an inconvenient form of preparation, owing to the bulk of the dose, which is very considerable, although from ℈j. to ʒj. only in weight.

PULVIS SPONGIÆ USTÆ. Dub. *Powder of burnt Sponge.*

"Let sponge cut into small pieces be beaten so as to free it from little stones; then burn it in a covered iron vessel, until it become black and friable; finally, reduce it to powder."

PULVIS ALUMINIS COMPOSITUS. Edin. *Compound Powder of Alum.*

"Take of sulphate of alum, *four parts;* kino, *one part.* Rub them together to a fine powder."

This is a powerful astringent powder, and is sometimes used internally in menorrhagia and diarrhœa; but is more generally employed as an external application. The dose is from grs. x. to grs. xv.; but it must be taken in the dry state, as the kino is decomposed by the alum, when a fluid vehicle is employed.

PULVIS TRAGACANTHÆ COMPOSITUS. Lond. *Compound Powder of Tragacanth.*[2]

"Take of tragacanth powdered, acacia gum powdered, starch, of each *an ounce and a half;* refined sugar; *three ounces.* Rub the starch and the sugar together to a powder; then add the tragacanth and the acacia gum, and mix the whole together."

In this composition the starch might well be omitted, as it is insoluble in cold water. This compound powder is efficaciously used as a demulcent in hectic fever, and to allay the tickling cough of catarrh: in gonorrhœa and strangury it is given combined with nitre; and in dysentry, with ipecacuanha powder. The dose is from ʒſs. to ℥iij. mixed in water or any bland fluid.

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[1] Poudre composée de Senna (*F.*) Polvere di Senna composta (*I.*)

[2] Poudre composée de Tragacanthe (*F.*) Tragacanthe Gummi pulver (*G.*) Polvere di Tragacanta composta (*I.*)

PILULÆ.

PILLS.

PILLS are masses of a consistence sufficient to preserve a round form, yet not so hard as to be of too difficult solution in the stomach. This form of preparation is particularly adapted for medicines which have a very nauseous taste or flavour, and such as operate in minute doses. Extracts, when not too hard, may be formed into pills without any addition; but more generally they are composed of either vegetable, or earthy, or metallic powders, combined by means of syrup into a coherent mass. Salts also may be formed into pills, except such as are deliquescent; and when efflorescent salts are used, they should be first freed from the water of crystallization, for the pills formed with uneffloresced salts which are apt to effloresce, fall into powder as they dry. The masses, which are ordered to be kept prepared for the formation of pills, require to be preserved in covered pots, wrapped in bladders, and occasionally moistened. When they are to be formed into pills, a given portion of the mass is rolled into a cylinder, the length of which is regulated by the number of pills into which it is to be divided; and the division is effected either as equally as possible by the hand, or by a machine invented for the purpose. (See *Instruments*, Part i.) After the round form is given to each of the pills, by rolling the divided pieces between the fingers, they are covered by some dried powder, as subcarbonate of magnesia or starch, to prevent them from adhering. With the same intention pills were formerly gilded; but as simple dry powders answers all the purposes of this covering, it is now altogether laid aside.

PILULÆ ALOES COMPOSITÆ. Lond. *Compound Alöetic Pills.*[1]

"Take of extract of spiked alöes powdered, *an ounce*; extract of gentian, *half an ounce*; oil of carraway, *forty minims*; syrup, *a sufficient quantity*. Beat them together until they combine into an uniform mass."

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[1] Pilules d'Aloë composée (*F.*) Pillole d'Aloë composte (*I.*)

PILULÆ ALÖETICÆ. Edin. *Alöetic Pills.*

"Take of Socotorine alöes in powder, soap, of each *equal parts.* Beat them with simple syrup, so as to make a mass fit for forming pills."

PILULÆ ALOES CUM ZINGIBERE. Dub. *Pills of Alöes and Ginger.*

"Take of hepatic aloes, *an ounce;* ginger root in powder, *a drachm;* soap, *half an ounce*; essential oil of peppermint, *half a drachm.* Let the aloes and the ginger be rubbed together to a powder; then add the soap and the oil so as to form a mass."

In the London preparation the quantity of extract of gentian ordered is too large; for, owing to its re-action on the aloes, the mass becomes rather too soft to form into pills: at all events no syrup is required in this instance. The soap ordered in the two other formulæ is well adapted for giving consistence and form to the aloes. This is an useful pill, and is advantageously used for obviating the habitual costiveness of the sedentary, and of leucophlegmatic habits. The dose is from grs. x. to grs. xv. or more.

PIL'ULÆ AL'OES ET ASSAFŒTIDÆ. Edin. *Pills of Alöes and Assafœtida.*[1]

"Take of Socotorine aloes in powder, assafœtida, soap, of each, *equal parts.* Beat them into a mass with mucilage of gum arabic."

These pills are anodyne and cathartic, allaying any irritability of the bowels, at the same time that they open them freely. They have been found extremely useful in dyspepsia attended with flatulence. The dose is grs. x. given twice a day.

PIL'ULÆ ALO'ËS CUM MYR'RHA. Lond. *Pills of Alöes with Myrrh.*[2]

"Take of extract of spiked aloes, *two ounces*; saffron, myrrh, of each *an ounce*; syrup, *a sufficient quantity.* Rub separately to powder the aloes and the myrrh; then beat all the ingredients together until they form an uniform mass."

Dublin.

"Take of hepatic aloes, *an ounce*; myrrh, *half an ounce*; saffron *two drachms*; essential oil of carraway, *half a drachm.* Rub the myrrh and the aloes separately to powder, and beat the whole together into a mass.

PILULÆ ALÖES ET MYRRHÆ. Edin. *Pills of Alöes and Myrrh.*

"Take of Socotorine aloes *four parts*; myrrh *two parts*; saffron *one part.* Beat them into a mass with simple syrup."

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[1] Pilules d'Aloë avec assafœtida (*F.*) Pillules Bloeteche con assafetida (*I.*)

[2] Pilulæ Ruffi seu communes, P. L. 1720 Pilules d'Aloé avec la Myrrh (*F.*) Pillole Aloetiche con Mirra(*I.*)

These pills have been long employed to stimulate and open the bowels in chlorotic, hypochondriacal, and cachectic habits. The dose is from grs. x. to ℈j. given twice a day.

PILULÆ AMMONIARETI CUPRI. Edin. *Pills of Ammoniaret of Copper.*[1]

"Take of ammoniaret of copper rubbed to fine powder, *sixteen grains*; crumb of bread, *four scruples*; water of carbonate of ammonia, *a sufficient quantity*. Beat them into a mass, and divide it into thirty-two equal pills."

This is a convenient form for the exhibition of the ammoniaret of copper, half a grain of which is contained in each of the pills. They are given in epilepsy and other spasmodic diseases. One pill given night and morning is sufficient at first; but the number may be gradually increased till five be taken for a dose.

PIL′ULÆ CAMBO′GIÆ COMPOS′ITÆ. Lond. Edin. *Compound Pills of Gamboge.*

"Take of gamboge in powder, extract of spiked alöes in powder, compound powder of cinnamon, of each *a drachm*; soap, *two drachms*. Mix the powders together; then add the soap, and beat the whole together into an uniform mass."

This is considerably more active than the alöetic pills. The dose is from grs. x. to ℈j. given at bed-time in obstinate costiveness.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. Edin. *Compound Colocynth Pills.*

"Take Socotorine aloes, scammony, of each *eight parts*; colocynth pulp, *four parts*; sulphate of potash, oil of cloves, of each *one part*. Beat the extract, gum resin, and sulphate together into powder, then, with the colocynth pulp rubbed to fine powder, mix them with the oil, and, finally, beat the whole into a mass with mucilage of gum."

Dublin.

"Take of colocynth pith, *half an ounce*; hepatic aloes, scammony, of each *one ounce*; Castile soap, *two drachms*; oil of cloves, *one drachm*. Pulverize separately the aloes, scammony, and colocynth, then triturate them with the soap and oil, and form them into a mass by means of syrup."

Both these are excellent forms of purgative pills. They are more powerful in their operation than the other aloetic pills; and do not so soon lose their power when taken for any considerable length of time in habitual costiveness.

PIL′ULÆ FER′RI COMPOS′ITÆ. Lond. *Pills of Iron with Myrrh.*

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[1] Pilules cuivreuses de Swédiaur (F.)

" Take of myrrh in powder, *two drachms*; subcarbonate of soda, sulphate of iron, sugar, of each *a drachm*. Rub the myrrh with the subcarbonate of soda; then having added the sulphate of iron, rub again; and lastly, beat the whole into an uniform mass."

This is an useful emmenagogue pill, similar in its properties to Griffith's mixture. The dose is from grs. x. to ℈j. given twice or three times a day.

PIL'ULÆ GAL'BANI COMPOS'ITÆ. Lond. *Compound Pills of Galbanum.*[1]

" Take of galbanum, *an ounce*; myrrh, sagapenum, of each *an ounce and a half;* assafœtida, *half an ounce*; syrup, *a sufficient quantity*. Beat them together into an uniform mass."

PILULÆ ASSAFŒTIDÆ COMPOSITÆ. Edin. *Compound Assafœtida Pills.*

" Take of assafœtida, galbanum, myrrh, of each *eight parts*; purified oil of amber, *one part*. Beat them into a mass with simple syrup."

PILULÆ MYRRHÆ COMPOSITÆ. Dub. *Compound Pills of Myrrh.*

" Take of assafœtida, myrrh in powder, galbanum, of each *an ounce;* oil of amber, *half a drachm*. Rub them together, and make them into a mass with simple syrup."

These preparations are useful antispasmodics and emmenagogues; and are given with advantage in chlorosis, hysteria, and hypochondriasis. The dose is from grs. x. to ℈j. taken every night at bed-time.

Of the three appellations employed by the Pharmacopœias, that of the Edinburgh is the least objectionable, the assafœtida being undoubtedly the most powerful article.

PILULÆ HYDRARGYRI. Lond. Dub. *Mercurial Pills.*[2]

"Take of purified mercury, *two drachms*; confection of red roses, *three drachms*; liquorice root in powder, *a drachm*. Rub the mercury with the confection until the globules disappear; then add the liquorice root, and beat the whole into an uniform mass."

Edinburgh.

" Take of purified mercury, conserve of the red rose, of each *an ounce*; starch, *two ounces*. Rub the mercury with the conserve in a glass mortar until the globules entirely disappear, adding, if necessary, a little mucilage of gum arabic; then add the starch, and with a little water beat the whole into a mass, which is to be directly divided into four hundred and eighty equal-sized pills."

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[1] Pilulæ gummosæ, P. L. 1720. Pilules de Galbanum composée (*F.*) Pillole di Galbano composte (*I.*)

[2] Pilules mercurialles (*F.*) Pillole mercuriale (*I.*)

One grain of mercury is contained in four grains of the mass, made according to the London and Dublin formulæ, and in three grains according to the Edinburgh.

In these preparations the mercury is first minutely divided by the viscosity of the conserve, the substance with which it is triturated: and formerly it was believed that this mechanical division was all that was effected by the trituration. It is now, however, generally, and with much probability, supposed that the metal is oxidized; and that the great extension of surface, and in some degree the substance used in the trituration, facilitate this effect. Syrup, honey, mucilage, soap, guaiac, and other matters, have been occasionally employed; but the Colleges have agreed in preferring conserve of roses; and it is not improbable that the operation is shortened by the weak acid which the conserve contains. On the continent the oil of eggs has been employed for dividing mercury[1], and certainly no substance so rapidly assists in producing the desired effect as this oil, when it has been kept for some time. In the above preparations, therefore, the mercury is nearly in the state of the black oxide, and on this combination of oxygen its activity as a remedy altogether depends. The more assiduously the trituration is continued, so as to bring the surfaces of the globules of mercury quickly and repeatedly into contact with the air, the more perfect is the preparation. The oxidizement of the whole of the globules, or the extinction or killing of the mercury, as it is termed in the common language of the laboratory, is known to be completed, when on rubbing a small portion of the mass with the point of the finger on a piece of clean paper, no metallic globules are perceptible. The mass must be then immediately formed into pills, as it very rapidly becomes too hard, if allowed to remain.

Medical properties and uses. — These pills are stimulant and antisyphilitic, and are the most common form of preparation under which mercury is exhibited for the cure of venereal affections, being much less liable to act on the bowels than any of the other forms. The common dose is grs. vj. to grs. viij. or two pills, given twice a day until the mouth be affected. Larger doses are apt to excite purging.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. Lond. Edin. *Pills of Submuriate of Mercury.*

" Take of submuriate of mercury (calomel), precipitated sulphuret of antimony, of each *a drachm;* guaiac gum-resin,

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[1] Vide *Lond. Med. Repository*, vol. v. p. 166.

two drachms. Rub the submuriate of mercury with the precipitated sulphuret of antimony, then with the guaiac, and add a sufficient quantity of mucilage of gum to give the mass a proper consistence."

This preparation was introduced into practice by Dr. Plummer, and admitted into the Edinburgh Pharmacopœia under the name of Plummer's pill. It was, however, afterwards expunged; but as it continued to be much used in practice, the London College has now given it a place in its Pharmacopœia. It is a very useful alterative in lepra, in secondary syphilis affecting the skin, and in other cutaneous diseases. The dose is from grs. v. to grs. x. given night and morning.

PILULÆ RHEI COMPOSITÆ. Edin. *Compound Rhubarb Pills.*[1]

"Take of rhubarb root in powder, *one ounce*; Socotorine aloes, *six drachms*; myrrh, *half an ounce*; volatile oil of peppermint, *half a drachm.* Beat them into a mass with syrup of orange peel."

This is a warm, stomachic, laxative pill, very useful for obviating costiveness, and at the same time giving tone to the bowels in dyspepsia and hypochondriasis. The dose is from grs. x. to ℈j. given twice a day.

PILULÆ SAPONIS CUM OPIO. Lond. *Pills of Soap and Opium.*[2]

"Take of hard opium powdered, *half an ounce*; hard soap, *two ounces.* Beat them together into an uniform mass." Five grains contain one grain of opium.

PILULÆ OPIATÆ; olim, PILULÆ THEBAICÆ. Edin. *Opiate Pills ;* formerly, *Thebaic Pills.*

"Take of opium, *one part*; extract of liquorice, *seven parts*; pimenta berries, *two parts.* Mix the opium and the extract, separately softened with diluted alcohol, and beat them into a pulp; then add the Jamaica pepper rubbed to powder, and beat the whole into a mass." Ten grains contain one grain of opium.

PILULÆ E STYRACE. Dub. *Storax Pills.*

"Take of purified storax, *three drachms*; soft purified opium, saffron, of each *a drachm.* Mix them well together by beating." Five grains contain one grain of opium.

The substances with which the opium is combined in these pills do not interfere with its operation as an anodyne, but are intended chiefly to cover its odour and taste in cases where the patient or his friends have an objection to opium; and as it is also sometimes necessary that it should not appear even in the prescription, the name adopted by the Dublin College is preferable to the others. The dose of the three preparations differs, and must be regulated by the quantity of opium contained in that one which is adopted.

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[1] Pilules dé Rhubarbe composée (*F.*) Pillole di Rhabarbaro composte (*I.*)
[2] Pilules d' Opium (*F.*) Pillole d' Oppio (*I.*)

PILULÆ SCILLÆ COMPOSITÆ. Lond. *Compound Squill Pills.*[1]

"Take of fresh squill root (bulb) dried and powdered, *one drachm*; ginger root powdered, hard soap, of each *three drachms*; ammoniacum powdered, *two drachms*. Mix the powders together; then beat them with the soap, as much syrup being added as will give them a proper consistence."

PILULÆ SCILLITICÆ. Edin. *Squill Pills.*

"Take of squill root (bulb) dried, and rubbed to a fine powder, *one scruple*; ammoniacum, cardamom seeds powdered, extract of liquorice, *one drachm*. Beat them with syrup into a mass."

PILULÆ SCILLÆ CUM ZINGIBERE. Dub. *Pills of Squill with Ginger.*

"Take of powder of squill, *a drachm*; ginger root in powder, *two drachms*; essential oil of anniseed, *ten drops*. Beat them together, and form them into a mass with jelly of soap."

These pills are useful expectorants in chronic catarrh, dyspnœa, and asthma; and combined with calomel and digitalis in hydropic affections. They are liable, however, to the same objections as the squill powder, the efficacy of the squill being much injured by keeping in either form; and it is perhaps better that it should be always given under an extemporaneous form, except when the tincture is used. The dose is from grs. x. to ℈j. given three or four times a day.

PILULÆ SUBCARBONATIS SODÆ. Edin. *Pills of Subcarbonate of Soda.*

Take of exsiccated subcarbonate of soda, *four parts*; hard soap, *three parts*. Beat into a mass with simple syrup.

This preparation was recommended by the late Dr. Beddoes; and has been found occasionally useful.

PILULÆ SULPHATIS FERRI COMPOSITÆ. Edin. *Compound Pills of Sulphate of Iron.*

"Take of sulphate of iron reduced to powder, *one ounce*; extract of chamomile flowers, *one ounce and a half*; oil of peppermint, *a drachm*. Beat into a mass with simple syrup."

This is a useful tonic pill, and may be given with advantage in dyspepsia and other affections in which steel is indicated. A five grain pill will contain two grains and a half of the sulphate of iron.

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[1] Pilules de Scille (*F.*) Pillole Squilitiche (*I.*)

TROCHISCI.

TROCHES.

THESE are little cakes or tablets composed of powders combined with sugar and mucilage. They are hard and dry, but readily dissolve in the mouth, for which purpose they are chiefly intended; and therefore, such remedies only as are designed to produce a local effect are given in this form. They are of little importance as remedies; and the preparation of them ought to be left entirely to the confectioner; or they should be altogether rejected from the Pharmacopœia, as has been done by the London and the Dublin Colleges.

TROCHISCI CARBONATIS CALCIS. Edin. *Troches of Carbonate of Lime.*

"Take of prepared carbonate of lime, *four ounces;* acacia gum, *an ounce;* nutmegs, *one drachm;* refined sugar, *six ounces.* Rub them to powder, and form them by means of water into a mass fit for making troches."

"These troches are intended as antacids; but in the state of the stomach when it requires the use of these remedies, the effect of the carbonate of lime is counteracted by the sugar."

TROCHISCI CARBONATIS MAGNESIÆ. Edin. *Troches of Carbonate of Magnesia.*

"Take of carbonate of magnesia, *six ounces;* refined sugar, *three ounces*; nutmegs, *a scruple.* Beat them into powder and form them into troches with mucilage of tragacanth."

These are used in the same cases as the former; and are more serviceable when the bowels are confined.

TROCHISCI GLYCYRRHIZÆ GLABRÆ. Edin. *Troches of Liquorice.*

"Take of extract of liquorice, gum arabic, of each *one part*; refined sugar, *two parts*; boiling water, *a sufficient quantity.* Dissolve and strain, then evaporate the solution, by a gentle heat, to a proper consistence for forming troches."

These troches are demulcent, and from the viscid nature of the extract of liquorice are well adapted for allaying the tickling irritation which induces coughing; but they are not more useful than the simple extract of liquorice refined by straining and inspissation, such as is found in the shops under the name of refined liquorice.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. Edin. *Liquorice Troches with Opium.*

"Take of opium, *two drachms*; tincture of balsam of Tolu, *half an ounce*; simple syrup, *eight ounces*; extract of liquorice, softened by hot water, gum arabic in powder, of each *five* *ounces.* First rub the opium well with the tincture; then add gradually the syrup and the extract; afterwards sprinkle in the powdered gum arabic; lastly, dry the mass, and form it into troches, each weighing ten grains."

These troches are used for the same purposes as the former; and from the opium they contain are more efficacious in allaying tickling cough. Six troches contain one grain of opium; and from six to ten may be taken in twenty-four hours.

TROCHISCI GUMMOSI. Edin. *Gum Troches.*

"Take of gum arabic, *four parts*; starch, *one part*; refined sugar, *twelve parts.* Rub the whole to powder, and form it into a mass with rose water fit for forming troches."

These troches are simple demulcents, and answer sufficiently well for allaying the tickling irritation of the fauces which excites coughing.

TROCHISCI NITRATIS POTASSÆ. Edin. *Troches of Nitrate of Potash.*

"Take of nitrate of potash, *one part*; refined sugar, *three parts.* Beat them to powder, and form them into a mass fit for forming troches by means of mucilage of tragacanth."

These troches afford an agreeable form of taking nitre in the dry state; and are useful for cooling the mouth in salivations, and in stopping the progress of inflammatory sore-throat, when taken at its commencement. They may also be used as a general refrigerant in fevers, diluting largely during their use. The dose is one or two taken every second or third hour.

PRÆPARATA EX ANIMALIBUS.

PREPARATIONS FROM ANIMALS.

THE substances of this division are few in number, and are not remedies of much efficacy.

ADEPS PRÆPARATA. Lond. *Prepared Lard.*[1]

"Cut the fat into small fragments; then melt it by a gentle heat, and press it through linen."

ADEPS SUILLUS PRÆPARATUS. Dub. *Prepared Hog's Lard.*

"Let fresh lard, cut into small pieces, be melted by a moderate heat, and strained by pressing it through a linen cloth.

"Lard, which is prepared by the dealers, and is preserved with salt, is to be melted with twice its weight of boiling water, and the mixture well stirred: it is then to be allowed to cool, when the lard may be separated."

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[1] Adeps Suillæ preparata, P. L. 1787.

SEVUM PRÆPARATUM. Lond. *Prepared Suet.*[1]

"Cut the suet in pieces; then melt it by a gentle heat, and press it through linen."

The properties of lard and suet have been already detailed. (*Part* ii.) The above processes are intended to purify them; but, in order to obtain them very pure, it is necessary that they be washed in water until the water come off colourless, before they be melted. Any water that may remain attached to the fat is evaporated during the melting; and that it is all evaporated, is known by throwing a little of the melted fat into the fire, when it will crackle if any water be present. The heat must not be raised above 97°, the melting point of fat; as otherwise the fat is decomposed, rendered acrid, and assumes a yellow colour. This purification is seldom attempted by the apothecary, as both kinds of fat can be procured very well purified from the dealers. To keep lard clean, and preserve it from the action of the air, it is generally run into bladders while in the liquid state.

CORNU USTUM. Lond. *Burnt Hartshorn.*[2]

"Burn pieces of hart's horn in an open fire until they become thoroughly white; then powder them, and prepare them in the manner directed for the preparation of chalk."

From the title given to this preparation, one might be led to suppose that any kind of horn would serve as a substitute for hart's horn, which is intended to be designated: but the properties of hart's horn are more similar to those of bone than of the horns of other animals, the chief difference being in the proportion of cartilage, which is greater in the hart's horn than in bone.

In performing this operation the fire must not be too violent, as the horn is apt to suffer a species of vitrification of the surface, when exposed to a very strong heat, which prevents the internal parts from being completely burnt. The residue of 100 parts of hart's horn consists, after the burning, of 57·5 of phosphate of lime, one of carbonate of lime, and a minute portion of phosphate of magnesia.

Medical properties and uses.—Phosphate of lime is perfectly inert when taken into the stomach; and the analysis of burnt hart's horn has clearly proved, that the former idea of its antacid properties was erroneous. It has been proposed as a remedy in rickets and mollities ossium; but we cannot easily conceive how it can be taken up by the absorbents, and thrown upon the bones; and experience has not yet confirmed the theory, nor indeed utility, of burnt hart's horn for any purpose as a remedy.

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[1] Sevum Ovillum preparatum, P. L. 1787.

[2] Cornu Cervi ustum, P. L. 1787.

Officinal preparation. *Mistura Cornu usti.* L.

SPONGIA USTA. Lond. *Burnt Sponge.*

"Cut sponge into small pieces and bruise it, in order to free it from any adhering extraneous substances; then burn it in a covered iron vessel, until it become black and friable; finally, rub it to a very fine powder."

The properties of fresh sponge have been already noticed: when burnt, the residue consists of carbonate and phosphate of lime, subcarbonate of soda, and charcoal. The principal active ingredient is the subcarbonate of soda, but it is asserted that a mixture of this principle and charcoal does not produce the effects of burnt sponge.

Medical properties and uses. — Burnt sponge is tonic, deobstruent, and antacid. It has been much recommended in bronchocele, scrophulous affections, and herpetic eruptions: and I have witnessed its efficacy in scirrhous testicle, when given in combination with cinchona bark. The dose is from ʒj. to ʒiij. mixed into the form of an electuary, with powdered cinnamon and honey. In bronchocele the patient is directed to swallow the portion of electuary very slowly, from a supposition that some local effect is produced.

TESTÆ PRÆPARATÆ. Lond. *Prepared Shells.*

"Wash the shells with boiling water, having previously freed them from extraneous matters, then prepare them in the manner directed for the preparation of chalk."

OSTREARUM TESTÆ PRÆPARATÆ. Dub. *Prepared Oyster Shells.*

"These are to be prepared in the same manner as chalk."

OVORUM TESTÆ PRÆPARATÆ. Dub. *Prepared Egg Shells.*

"These are to be prepared in the same manner as chalk."

Both in oyster and egg-shells the predominating ingredient is carbonate of lime, and therefore these prepared shells do not differ from chalk, except in containing a small portion of gelatin or albumen. But as this does not in any degree affect their medicinal properties, which are exactly the same as those of chalk, they might well be spared from the list of preparations. The dose is from grs. x. to ʒij. or more.

EMPLASTRA.

PLASTERS.

THESE are solid, tenacious compounds, adhesive in the ordinary heat of the human body. The base of the majority of plasters is a chemical combination of the semivitreous oxide of lead and oil; but some of them owe their consistence to wax and resin; and others contain no oily nor fatty matter whatsoever. Deyeux proposes[1] to confine the name of plasters to the combinations of metallic oxides with oils or fat; and to give those not containing oxides, the term solid ointments; but this definition would include among the plasters some of the ointments, and exclude many of the plasters.

Plasters should not adhere to the hand when cold; they should be easily spread when heated; and should remain tenacious and pliant after they are spread; but should not be so soft as to run when heated by the skin. All plasters become too consistent and brittle when long kept; but in this case, those which are unctuous may be re-melted by a gentle heat, and some oil added to them. They are usually formed into rolls, each of which is wrapped in paper; and when to be used, they are melted and spread on leather, calico, linen, or silk. Those that contain metallic oxides ought to be melted by boiling water, for in a greater degree of heat the fatty matter is apt to reduce the oxide.

Plasters are employed as local remedies to answer various indications. When the materials of which they are formed are soft and bland, they are used simply as coverings to sores and abraded surfaces, to protect them from the action of the air, and give support to the parts; but in many instances they contain acrid and stimulating substances, and operate as rubefacients, or as blisters.

EMPLASTRUM AMMONIACI. Lond. Edin. *Ammoniac Plaster.*

"Take of purified ammoniac, *five ounces*; acetic acid, (distilled vinegar,) *half a pint.* Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron vessel placed in a water-bath, constantly stirring until it acquire a proper consistence."

This plaster is stimulant and resolvent. It is applied to scrophulous tumours and white swellings; and sometimes over the scalp, in tinea capitis.

EMPLASTRUM AMMONIACI, CUM HYDRARGYRO. Lond. *Ammoniac Plaster with Mercury.*

"Take of purified ammoniac, *a pound*; purified mercury, *three ounces*; sulphureted oil, *a fluid drachm.* Rub the mercury with the sulphureted oil until the globules disappear; then add gradually the ammoniac previously melted, and mix the whole together."

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[1] *Annales de Chimie,* xxxiii. 52.

Dublin.

"Take of pure gum ammoniac, *a pound*; purified mercury, *three ounces*; turpentine, *two drachms.* Rub the mercury with the turpentine until the globules disappear; then add gradually the ammoniac previously melted, and melt the whole together."

In these plasters the mercury is in the state of oxide, with a minimum of oxygen. They are powerful discutients, and are applied to indurated glands, hydarthus, nodes, tophi, and indolent tumours.

EMPLASTRUM AROMATICUM. Dub. *Aromatic Plaster.*

"Take of frankincense, *three ounces;* yellow wax, *half an ounce;* cinnamon bark in powder, *six drachms;* oil of pimenta, oil of lemons, of each *two drachms.* Melt the frankincense and the wax together, and strain the mixture; when it thickens by cooling, mix with it the powder of cinnamon previously rubbed with the oils, and form them into a plaster."

This plaster, which is an elegant stimulant, is applied on the region of the stomach in dyspepsia, and increased irritability of that viscus, to allay pain and vomiting; and to expel flatus. As the oils are very volatile, it must be spread with the thumb without being melted. It requires to be frequently renewed, and is consequently not very adhesive.

EMPLASTRUM ASSAFŒTIDÆ. Edin. *Assafœtida Plaster.*

"Take of plaster of semivitreous oxide of lead, assafœtida, of each *two parts*; galbanum, yellow wax, of each *one part.*"

This plaster is sometimes applied over the umbilical region, in flatulence and hysteria.

EMPLASTRUM CALEFACIENS. Dub. *Warm Plaster.*

"Take of plaster of cantharides, *one part*; Burgundy pitch, *seven parts.* Melt them together with a moderate heat, and mix them so as to form a plaster."

This plaster is stimulant and rubefacient, and is applied with advantage in catarrh, hooping-cough, sciatica, and local pains.

EMPLASTRUM CERÆ. Lond. *Wax Plaster.*

"Take of yellow wax, prepared suet, of each *three pounds*; yellow resin, *a pound.* Melt them together, and strain."

EMPLASTRUM SIMPLEX. Edin. *Simple Plaster.*

"Take of yellow wax, *three parts*; mutton suet, white resin, of each *two parts.*"

These plasters were originally intended for dressing blistered parts, with the view of promoting a discharge; but, owing to the pain and irritation they induce, they are now seldom employed. They may be spread with a hot iron.

Officinal preparation. *Emplastrum Lyttæ.* L.

EMPLASTRUM CUMINI. Lond. *Cumin Plaster.*

"Take of cumin seeds, carraway seeds, laurel berries, of each *three ounces;* dried pitch, *three pounds;* yellow wax, *three ounces.* Melt the pitch and the wax together, then add the other ingredients in powder, and mix."

This plaster is stimulant and discutient. It is applied to the hypogastric region in flatulence and a cold feeling of the bowels, and to indolent tumours.

EMPLASTRUM GALBANI COMPOSITUM. Lond. *Compound Galbanum Plaster.*

"Take of purified galbanum, *eight ounces;* plaster of lead, *three pounds;* common turpentine, *ten drachms;* resin of the spruce-fir powdered, *three ounces.* Having melted the galbanum and the turpentine together, mix in first the resin, and then the plaster of lead previously melted by a slow fire, and mix the whole together."

EMPLASTRUM GUMMOSUM. Edin. *Gum Plaster.*

"Take of plaster of semivitreous oxide of lead, *eight parts;* ammoniac gum-resin, galbanum, yellow wax, of each *one part.* Add the gum resins to the melted plaster and wax, and mix."

EMPLASTRUM GALBANI. Dub. *Plaster of Galbanum.*

"Take of litharge plaster, *two pounds;* galbanum, *half a pound;* yellow wax sliced, *four ounces.* To the galbanum melted by heat add the litharge plaster and the wax; then melt the whole together by a gentle heat."

These plasters are stimulant and suppurative. They are applied with advantage to scrophulous tumours; to joints which have been long affected with arthritic pains; and to the loins in rickets. As a suppurative they are applied to indolent tumours; and to reduce the induration which often remains around abscesses, after they are discharged.

EMPLASTRUM HYDRARGYRI. Lond. *Mercurial Plaster.*[1]

"Take of purified mercury, *three ounces;* sulphureted oil, *a fluid drachm;* plaster of lead, *a pound.* Rub the mercury with the sulphureted oil until the globules disappear; then add by degrees the lead plaster melted, and mix the whole."

Edinburgh.

"Take of olive oil, resin, of each *one part;* mercury, *three parts;* plaster of semivitreous oxide of lead, *six parts.* Rub the mercury with the oil and the resin previously melted together and cooled, until the globules disappear; then add gradually the plaster of semivitreous oxide of lead melted, and let the whole be carefully mixed together."

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[1] Quecksilberpflaster (*G.*)

The mercury in these plasters is in the state of oxide, with a minimum of oxygen; and the sulphureted oil, ordered by the London College, is intended to diminish the labour required for this oxidizement of the metal. The plasters are powerful discutients, and are applied to buboes, venereal tumours, nodes, when they are not very painful to the touch, and indurations: they are also applied to joints affected with obstinate syphilitic pains.

EMPLASTRUM LYTTÆ. Lond. *Blistering Plaster.*[1]

"Take of blistering flies reduced to a very fine powder, *a pound*; wax plaster, *a pound and a half*; prepared lard, *a pound*. Melt the plaster and the lard together, and having removed them from the fire, when the mixture is just about to become solid, sprinkle in the blistering flies, and mix the whole together."

EMPLASTRUM CANTHARIDIS VESICATORIÆ. Edin. *Blistering Plaster.*

"Take of mutton suet, wax, white resin, blistering flies reduced to a very fine powder, of each *equal weights*. Mix the powder with the other articles previously melted together, and removed from the fire; then stir until the mixture stiffens in cooling."

EMPLASTRUM CANTHARIDIS. Dub. *Blistering Plaster.*

"Take of purified yellow wax, mutton suet, of each *a pound*; yellow resin, *four ounces*; blistering flies in fine powder, *a pound*. Melt the wax, the suet, and the resin together, and a little before they concrete in becoming cold, sprinkle in the blistering flies, and form the whole into a plaster."

These plasters are of a moderately soft consistence, so as to admit of being spread without the assistance of heat, which destroys the acrimony and epispastic property of the flies; but they seldom fail of raising a blister, if the flies be good, and have not been added when the other ingredients were too hot. When they are to be used, a piece of leather of a proper shape and size is first spread with adhesive plaster, and over this the blistering plaster is extended of a moderate degree of thickness, and as smooth as possible, by the means of the thumb; a proper margin being left, so as to enable it to adhere closely to the skin. There is, however, an evident waste of flies, as those flies only which are on the surface of the plaster, when it is spread, act on the skin; and it has been suggested by Parmentier[2], that the same effect would be more œconomically produced by sprinkling the powdered flies on a piece of farinaceous paste, spread on linen or leather. Blistering plasters require to remain applied for twelve hours to raise a perfect blister; they are then to be removed, the vesicle is to be cut at the most depending part, and without removing the cuticle, the vesicated part is to be dressed with simple cerate or spermaceti ointment; and the old cuticle allowed to remain until a new one is formed under it, when it peels off, and the whole is healed in the course of a few days. The application of these plasters, however, is sometimes attended with strangury and bloody urine, which arise from the active principles of the insect being absorbed, and irritating the kidneys and urethra. This effect is very much increased if the blister be applied over an abraded surface, as, for example, on the head immediately after it has been shaved; and it also occurs if the plaster remain too long applied. To prevent strangury, camphor has been recommended to be mixed with the blistering composition, but it has no good effect; and it is better obviated by copious dilution with milk, or mucilaginous fluids, and fomentations of warm milk and water to the blistered part, after the removal of the plaster. When the head is the part intended to be blistered, it should be shaved at least ten hours before the plaster is applied; and in all cases it is perhaps a good rule to interpose a piece of thin gauze between the vesicatory and the skin, wetted with vinegar, and applied smooth and very close over the plaster.

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[1] Emplatre de Cantharides (*F.*) Kanthariden pflaster (*G.*) Empiastro di Cantarelle (*I.*)

[2] *Annales de Chimie*, xlviii.

In some diseases of irritation, particularly in children, the blistered part, instead of healing kindly, becomes a spreading sore; the cutis vera is destroyed, and the part cannot be healed until the irritability of habit which induced this unpleasant state is allayed. In such cases, the best local application is a warm emollient poultice; and bathing the denuded surface frequently with tepid milk and water; while at the same time cinchona bark is internally administered.

EMPLASTRUM CANTHARIDIS VESICATORIÆ COMPOSITUM. Edin. *Compound Plaster of Spanish Flies.*

"Take of Venice turpentine, *eighteen parts*; Burgundy pitch, blistering flies, of each *twelve parts*; yellow wax, *four parts*; subacetite of copper, *two parts*; white mustard seeds, black pepper, of each *one part*. Melt the Burgundy pitch and the wax, and add to them the turpentine. While these remain still warm, after being melted, sprinkle in the other ingredients reduced to fine powder, and mix them, stirring constantly, so as to form a plaster."

This plaster is intended to raise a blister more quickly than the former; and hence is adapted for cases of gout and cramps of the stomach, in which the effect of the blister must be almost instantly produced. Its operation is accompanied with great pain, and a very pungent sense of heat: and it is apt to produce very unpleasant ulceration if allowed to remain too long applied.

EMPLASTRUM OPII. Lond. Edin. *Plaster of Opium.*[1]

"Take of hard opium powdered, *half an ounce*; resin of the spruce-fir powdered, *three ounces*; lead plaster, *a pound.* Melt the plaster and the resin together, then add the opium, and mix the whole."

This plaster is anodyne, and supposed to be useful in relieving rheumatism and local pains: but although it is undoubtedly certain that opium, in that state of minute division in which it exists in the tincture, produces its specific effect on the system in a small degree, when externally applied; yet we doubt whether the anodyne properties of this plaster are such as to sanction its adoption into the London Pharmacopœia.

EMPLASTRUM OXIDI FERRI RUBRI. Edin. *Plaster of red Oxide of Iron.*

"Take of plaster of semivitreous oxide of lead, *twenty-four parts*; white resin, *six parts*; yellow wax, olive oil, of each *three parts*; red oxide of iron, *eight parts.* Rub the red oxide of iron with the oil, and adding the other ingredients melted, mix the whole well together."

EMPLASTRUM THURIS. Dub. *Plaster of Frankincense.*

"Take of litharge plaster, *two pounds*; frankincense, *half a pound*; red oxide of iron, *three ounces.* To the plaster and frankincense melted together add the oxide, stirring them together so as to form a plaster."

These plasters are supposed to be tonic; and are used in muscular relaxations, and weaknesses of the joints after sprains: but they act chiefly in affording a mechanical support to the parts.

EMPLASTRUM PICIS COMPOSITUM. Lond. *Compound Pitch Plaster.*

"Take of dried pitch, *two pounds*; frankincense, *a pound*; yellow resin, yellow wax, of each *four ounces*; expressed oil of nutmeg, *an ounce.* To the pitch, resin, and wax, melted together, add first the frankincense, then the oil of nutmeg, and mix the whole."

This plaster is stimulant and rubefacient. It is used in catarrh, and other pulmonary affections, applied to the thorax; and in head-ach and chronic ophthalmia, applied to the temples. When a serous exudation takes place, the plaster should be frequently renewed.

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[1] Opiumspflaster (*G.*)

EMPLASTRUM PLUMBI. Lond. *Lead Plaster.*[1]

"Take of semivitreous oxide of lead, rubbed to a very fine powder, *five pounds*; olive oil, *a gallon*; water, *two pints*. Boil them together over a slow fire, stirring constantly until the oil and oxide of lead cohere into the consistence of a plaster. It will be necessary, however, to add a little boiling water, if that which was employed in the beginning shall be consumed before the end of the process."

EMPLASTRUM OXIDI PLUMBI SEMI-VITREI. Edin. *Plaster of Semivitreous Oxide of Lead.*

"Take of the semivitreous oxide of lead, *one part*; olive oil, *two parts*; water, *a sufficient quantity*. Boil them, stirring constantly, until the oil and the oxide unite into a plaster."

EMPLASTRUM LITHARGYRI. Dub. *Litharge Plaster.*

"Take of litharge in fine powder, *five pounds*; olive oil, *nine pounds*; boiling water, *two pints*. Mix them at a high temperature, constantly stirring, until the oil and the litharge unite so as to form a plaster; supplying occasionally any waste of water that may take place."

The use of the water in the formation of these plasters is to moderate the heat of the mixture, until the oil and the oxide combine, by which means the reduction of the metal is prevented; a circumstance which is apt to take place from the strong attraction of the oil for oxygen when raised to a high temperature. By continuing the boiling the water is dissipated; and the temperature can then be increased to a sufficient degree to give the plaster the necessary consistency. The water which is added should be previously made hot; as cold water is apt to produce an explosion, which may prove dangerous to the operator. When long kept, these plasters change their colour, and lose most of their sensible properties.

These plasters are intended chiefly to defend excoriated surfaces from the action of the air; and to form the basis of some other plasters.

Officinal preparations. *Emplastrum Hydrargyri.* L. E. *Emplastrum Opii.* L. *Emplastrum Assafœtidæ.* E. *Emplastrum gummosum.* E. *Emplastrum Galbani.* D. *Emplastrum Galbani compositum.* L. *Emplastrum Oxidi Ferri rubri.* E. *Emplastrum Resinæ.* L. E. D. *Emplastrum Saponis.* L. E. D. *Emplastrum Thuris.* D.

EMPLASTRUM RESINÆ. Lond. *Resin Plaster.*[2]

"Take of yellow resin, *half a pound*; lead plaster, *three pounds*. Melt the lead plaster by a gentle heat, then add the resin in powder, and mix."

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[1] Emplatre de diachylon (*F.*) Bleipflaster (*G.*)

[2] Harzigtes Bleipflaster (*G.*)

EMPLASTRUM RESINOSUM. Edin. *Resinous Plaster.*

"Take of plaster of semivitreous oxide of lead, *five parts*; resin, *one part*. Melt them with a gentle heat; then continue stirring the mixture until it becomes stiff in cooling."

EMPLASTRUM LITHARGYRI CUM RESINA. Dub. *Litharge Plaster with Resin.*

"Take of litharge plaster, *three pounds and a half*; yellow resin, *half a pound*. Melt the litharge plaster by a moderate heat, then add the resin reduced to very fine powder, that it may melt quickly, and form a plaster."

These plasters are defensive, adhesive, and gently stimulant. They are used for retaining together the lips of recent wounds, when it is wished to heal them by the first intention; to give support to ulcerated parts; and to assist their granulation and cicatrization, according to the excellent method of Mr. Baynton. The plaster, however, originally used by Mr. Baynton contained less resin; ℥vj. only being added to lb. j. of the litharge plaster; but this preparation answers the purpose equally well, except in very irritable habits. The best substance for spreading it on for the above purpose is calico; and it is of some importance to spread it equally and thin; to effect which the calico must be stretched, and the plaster melted and beginning to cool, must be poured on one end of it, and equally extended over the whole surface by means of a spatula, held horizontally, and one edge of the blade raised to an angle of 45 degrees: or it may be still more equally done by passing the calico, on which the fluid plaster has been poured, through a machine formed of a straight blade of steel, fixed by screws, at a proper distance from a polished plate of the same metal. It is sold ready spread.

EMPLASTRUM SAPONIS. Lond. Dub. [1]*Soap Plaster.*

"Take of hard soap sliced, *half a pound*; lead plaster, *three pounds*. Mix the soap with the melted plaster; then boil it down to a proper consistence."

EMPLASTRUM SAPONACEUM. Edin. *Soap Plaster.*

"Take of semivitreous oxide of lead, *four parts*; gum plaster, *two parts*; soap sliced, *one part*. Mix the soap with the plasters melted together; then boil them a little so as to form a plaster."

Dr. Powell properly observes, that the soap plaster of the London College "must be formed into rolls when it begins to thicken, for afterwards, although it be still somewhat soft, it loses its tenacity, and will break to pieces."[2]

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[1] Seifenpflaster (*G.*)

[2] *Powell's Translation of the London Pharmacopœia*, 2d. edit. 324.

Soap plaster is discutient; and is applied to lymphatic tumors: but it is much less useful than the mercurial plaster.

CERATA.

CERATES.

THESE are unctuous compositions possessing a certain degree of firmness, intermediate between that of plasters and that of ointments. Their consistence depends on the wax they contain; and from it they derive their generic appellation. The most important circumstance to be attended to in their preparation is the freshness of the fat and the oils employed; and their preservation in this state.

CERATUM SIMPLEX. Lond. *Cerate.*[1]

"Take of olive oil, *four fluid ounces;* yellow wax, *four ounces.* Add the oil to the melted wax, and mix."

This is an useful simple emollient dressing to excoriations and sores.

CERATUM CALAMINÆ. Lond. *Calamine Cerate.*

"Take of prepared calamine, yellow wax, of each *half a pound*; olive oil, *a pint.* Mix the oil with the melted wax; then remove the mixture from the fire, and as soon as it begins to thicken, add the calamine, stirring constantly until it be cold."

CERATUM CARBONATIS ZINCI IMPURI. Edin. *Cerate of Impure Carbonate of Zinc.*

"Take of simple cerate, *five parts*; prepared impure carbonate of zinc, *one part.* Mix."

UNGUENTUM CALAMINARE. Dub. *Calamine Ointment.*

"Take of ointment of yellow wax, *five pounds*; prepared calamine, *a pound.* Make them into an ointment."

These preparations are very useful dressings to excoriations and ulcers; and as they are in some degree desiccative, they are also applied to burns after the inflammation is abated; and to the eye-lids in ophthalmia tarsi. They have been long known in practice under the name of *Turner*'s cerate.

CRATUM CETACEI. Lond. *Spermaceti Cerate.*[2]

"Take of spermaceti, *half an ounce;* white wax, *two ounces;* olive oil, *four fluid ounces.* Melt the spermaceti and the wax together, then add the oil, and stir them until they be cold."

CERATUM SIMPLEX. Edin. *Simple Cerate.*

"Take of olive oil, *six parts;* white wax, *three parts*; spermaceti, *one part.* Melt the wax and spermaceti in the oil, with a gentle heat; then keep constantly stirring until the mixture stiffens in cooling.

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[1] Cerat simple (*F.*) Cerotto semplice (*I.*)

[2] Cerat de blanc de balaine (*F.*) Cerotto di Spermaceti (*I.*)

These are soft cooling dressings.

Officinal preparations. *Ceratum Lyttæ.* L. *Ceratum Carbonatis Zinci impuri.* E.

CERATUM LYTTÆ. Lond. [1] *Cerate of Blistering Flies.*

"Take of spermaceti cerate, *six drachms*; blistering flies reduced to a very fine powder, *a drachm.* Add the blistering flies to the cerate, softened by the fire, and mix them together."

This cerate is intended to promote a purulent discharge from a blistered surface; and in general it answers this intention without occasioning much irritation. In some habits, however, it occasions strangury, great pain of the part, swellings of the lymphatics, and so much general irritation as to produce œdematose swellings and erysipelas of the neighbouring parts.[2]

It may be proper to observe, that it is preferable to spread cerates or ointments, intended to keep open issues, on lint; and that the dressings should in all cases be renewed once in twenty-four hours.

CERATUM PLUMBI SUPERACETATIS. Lond. *Cerate of Superacetate of Lead.*

"Take of superacetate of lead in powder, *two drachms*; white wax, *two ounces*; olive oil, *half a pint.* Melt the wax in seven fluid ounces of the oil; then add gradually the superacetate of lead separately rubbed down with the remaining oil, and stir with a wooden spatula, until they be thoroughly incorporated."

This is an excellent cooling cerate for burns, excoriations, and other inflamed sores.

CERATUM PLUMBI COMPOSITUM. Lond. *Compound Cerate of Lead.*[3]

"Take of solution of acetate of lead, *two fluid ounces and a half*; yellow wax, *four ounces*; olive oil, *nine fluid ounces*; camphor, *half a drachm.* Melt the wax and mix it with eight fluid ounces of the oil; then remove them from the fire, and as soon as they begin to thicken, add gradually the solution of acetate of lead, and stir assiduously with a wooden spatula till they be cold. Finally, mix with these the camphor dissolved in the remainder of the oil."

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[1] Cerat de Cantharides (*F.*) Cerotto di Cantarille (*I.*)

[2] In one case, which came under my observation, a blister on the scalp was dressed for four days with this cerate. On the fourth day the head swelled to an alarming size; and an œdematose erysipelas covered the scalp and face, and shut up the eyes; accompanied with a great degree of fever. On removing the acrid dressings, and employing emollient fomentations, with dressings of cetaceous ointment, these alarming symptoms soon subsided.

[3] This name is extremely improper. It ought to have been *Ceratum Plumbi Acetatis*, the virtue of the composition depending altogether on the acetate of lead.

This composition is similar to what was recommended by Goulard, as a mode of applying lead in the form of ointment; and long known under the name of *Gqulard's cerate.* It is applicable to the same cases as the former cerate.

CERATUM RESINÆ. Lond. *Resin cerate.*[1]

"Take of yellow resin, yellow wax, of each *a pound*; oil of olive, *a pint.* Melt the resin and the wax together by a slow fire, then add the oil, and strain the cerate while it is hot through a linen cloth."

Unguentum Resinosum. Edin. *Resinous Ointment.*

"Take of hog's lard, *eight parts*; resin, *five parts*; yellow wax, *two parts.* Melt the whole with a gentle heat, and stir the mixture until it stiffens in cooling.

Unguentum Resinæ albæ. Dub. *Ointment of White Resin.*

"Take of yellow wax, *a pound*; white resin, *two pounds*; prepared hog's lard, *four pounds.* Make them into an ointment, which is to be strained, while it is hot, through a sieve."

These ointments are stimulant, digestive, and cleansing; and therefore form an excellent dressing for foul and indolent ulcers.

Officinal preparation. *Linimentum Terebinthinæ.* L.

CERATUM SABINÆ. Lond. *Cerate of Savine.*

"Take of the fresh leaves of savine bruised, *a pound*; yellow wax, *half a pound*; prepared lard, *two pounds.* Melt the lard and the wax together, and boil the savine leaves in the mixture; then strain through a linen cloth."

Unguentum Sabinæ. Dub. *Savine Ointment.*

"Take fresh leaves of savine freed from the stalks and bruised, *half a pound*; prepared hog's lard, *two pounds*; yellow wax, *half a pound.* Boil the leaves with the lard until they become crisp; then strain with expression; lastly, add the wax, and melt them together."

The preparation of this ointment is exceedingly difficult, as the acrid principle of the savine, on which its efficacy depends, is much injured by long boiling, or too high a temperature. Might it not be better to express the acrid juice from the fresh leaves, and mix it with the ointment when it begins to thicken by cooling? If the fresh leaves cannot be procured, it may be prepared from the dry leaves reduced to a fine powder; but the acrimony of the savine is impaired by drying them. The ointment when good has a beautiful deep green colour, and the odour of the fresh bruised herb. It should be kept in closely covered pots, as it soon loses its virtue by exposure to the air.

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[1] Cerat Resineux (*F.*) Harzzerat (*G.*) Cerotto Resinoso (*I.*)

Savine ointment, which was first described by Mr. Crowther[1], is well calculated for keeping up a purulent discharge from a blistered surface; which it does as effectually, and with much less irritation than the ointment of blistering flies. A white coat is apt to form on the discharging surface, and must be removed occasionally so as to allow the cerate to be applied to the sore.

CERATUM SAPONIS. Lond. *Cerate of Soap.*

"Take of hard soap, *eight ounces*; yellow wax, *ten ounces*; semivitreous oxide of lead powdered, *a pound*; olive oil, *a pint*; vinegar, *a gallon*. Boil the vinegar on the oxide of lead over a slow fire, stirring diligently until they incorporate; then add the soap, and boil again in a similar manner, until the moisture be entirely evaporated; lastly, mix with the oil the wax previously melted."

The efficacy of this cerate evidently depends on the acetate of lead which is formed in the first stage of the process, the soap answering scarcely any other purpose than to give consistence and adhesiveness. It is occasionally used as a cooling dressing.

UNGUENTA.

OINTMENTS.

THESE are unctuous substances of nearly the same nature as cerates, but having a consistence much less firm, scarcely exceeding that of butter.

UNGUENTUM ACIDI NITROSI. Edin. *Ointment of Nitrous Acid.*

"Take of hog's lard, *one pound*; nitrous acid, *six drachms*. Mix the acid gradually with the melted lard, and beat the mixture assiduously as it cools."

Dublin.

"Take of olive oil, *a pound*; prepared hog's lard, *four ounces*; nitrous acid, *an ounce by weight*. Melt the oil in a glass vessel, and add the acid to it; let them be exposed to a medium heat in a water-bath for a quarter of an hour, then remove them from the bath, and stir them constantly with a glass rod until they become firm."

In this process the acid is partially decomposed, nitrous gas is evolved, and the ointment is oxidized, assuming a yellow colour and a firm consistence. It was invented by Alyon, who found it useful in syphilitic and herpetic ulcers; and it has been occasionally used in this country for the same purposes; but it is less useful than the ointment of nitrate of mercury.

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[1] *Observations on White Swelling.*

UNGUENTUM CERÆ FLAVÆ. Dub. *Ointment of Yellow Wax.*

"Take of purified yellow wax, *a pound*; prepared hog's lard, *four pounds.* Form them into an ointment."

UNGUENTUM CERÆ ALBÆ. Dub. *Ointment of White Wax.*

"This is to be prepared in the same manner as the former, with the substitution of white for yellow wax."

These are useful dressings to benign ulcers and excoriations, and form the basis of the majority of the compound ointments of the Dublin Pharmacopœia.

UNGUEN'TUM CETA'CEI. Lond. *Spermaceti Ointment.*[1]

"Take of spermaceti, *six drachms*; white wax, *two drachms*; olive oil, *three fluid ounces.* Melt them together over a slow fire, and stir them constantly until they be cold."

UNGUENTUM SPERMATIS CETI. Dub. *Ointment of Spermaceti.*

"Take of white wax, *half a pound*; spermaceti, *a pound*; prepared lard, *three pounds.* Make them into an ointment."

These ointments form the ordinary dressings for healing blistered surfaces and excoriations.

UNGUENTUM EL'EMI COMPOS'ITUM. Lond. *Compound Ointment of Elemi.*[2]

"Take of elemi, *a pound*; common turpentine, *ten ounces*; prepared suet, *two pounds*; olive oil, *two fluid ounces.* Melt the elemi with the suet; then remove it from the fire, and mix in immediately the turpentine and the oil; lastly, strain the mixture through a linen cloth."

UNGUENTUM ELEMI. Dub. *Ointment of Elemi.*

"Take of elemi resin, *a pound*; white wax, *half a pound*; prepared hog's lard, *four pounds.* Form them into an ointment, which is to be strained through a sieve while it is hot."

These ointments are stimulant and digestive. They are used to keep open issues and setons; and as a dressing to ulcers which do not admit of the application of the adhesive straps.

UNGUEN'TUM HYDRAR'GYRI FOR'TIUS. Lond. *Strong Mercurial Ointment.*[3]

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[1] Unguentum Spermaceti, P.L. 1787.

[2] Unguentum e Gummi Elemi, P.L. 1745. Onguent d'Elemi et de Terebenthine (*F.*) Elemisalbe (*G.*) Unguento di Elemi e Trementina (*I.*)

[3] Ung. cæruleum fortius, P.L. 1745. Onguent. Mercuriale (*F.*) Quecksilbersalbe (*G.*) Unguento Mercuriale (*I.*)

"Take of purified mercury, *two pounds*; prepared lard, *twenty-three ounces*; prepared suet, *an ounce*. First rub the mercury with the suet and a little of the lard, until the globules disappear; then add the remainder of the fat, and mix."

Two drachms of this ointment contain one drachm of mercury.

UNGUENTUM HYDRARGYRI. Edin. *Mercurial Ointment.*

"Take of mercury, mutton suet, of each *one part*; hog's lard, *three parts*. Rub the mercury diligently in a mortar with a little of the hog's lard until the globules disappear; then add the remainder of the lard."

One drachm of this ointment contains twelve grains of mercury.

"It may also be made with double or triple the quantity of mercury."

Dublin.

"Take of purified mercury, prepared hog's lard, *equal weights*. Rub them together in a marble or an iron mortar until the globules disappear."

One drachm of this ointment contains thirty grains of mercury.

UNGUENTUM HYDRAR'GYRI MIT'IUS.[1] Lond. Dub. *Milder Mercurial Ointment.*

"Take of the stronger mercurial ointment, *a pound*; prepared lard, *two pounds*. Mix them."

One drachm of this ointment contains ten grains of mercury; but prepared according to the Dublin Pharmacopœia, with two parts of lard to one of mercury, one drachm contains a scruple of mercury.

The preparation of the stronger mercurial ointments requires much labour, care, and patience. During the trituration the mercury is mechanically divided into minute globules, which are prevented from running together again by the viscosity of the suet; and during the trituration they are afterwards gradually oxidized by attracting the oxygen of the atmosphere; the lard, the extension and the constant renewal of the surface exposed, favouring very much this effect. The fact of the oxidizement of the metal in this process is now generally admitted; and whatever tends to favour it, as, for instance, a slight degree of rancidity of the lard, or the oil of eggs, shortens the time, and lessens the labour required for the preparation of the ointment. It is not uncommon, however, to use other means, which are not admissible, to facilitate the process, such as the use of sulphur or turpentine. The first may be detected by the very black colour of the ointment, which is produced by the sulphuret of mercury; and also by the sulphurous odour exhaled, when a paper covered with a little of it is held over the flame of a candle: and the turpentine is detected by its odour also, when the ointment containing it is treated in the same manner. When newly prepared, mercurial ointment has a light gray or blueish colour, owing to its containing some unoxidized metal, which separates in globules when it is liquefied by a gentle heat: when kept for some time the colour is much deepened, and less metallic mercury subsides, owing to the more complete oxidizement of the metal. It is probable, therefore, that long kept mercurial ointment contains, besides the oxide, a sebate of mercury.

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[1] Unguentum cæruleum mitius, P. L. 1745.

Medical properties and uses.—The strong mercurial ointment rubbed upon the skin is the ordinary mode of introducing a large quantity of oxide of mercury into the system. About ʒj. is rubbed upon the inside of the thighs, or any other part of the body where the cuticle is thin, every night and morning until the system is affected. The oxide contained in the ointment is absorbed during the friction, and carried into the habit; where it produces the same effects as arise from taking the remedy by the mouth, without the unpleasant affection of the bowels that very commonly follows the introduction of preparations of mercury into the stomach. In order, however, to produce the full effect of the friction, it must be continued until every particle of the ointment disappears; and the operation should be performed by the patient himself. The stronger mercurial ointment is used in this form as an antisyphilitic, as a deobstruent in hepatic affections, and to excite the absorbents in hydrocephalus. The weaker ointment is used only as a topical dressing in venereal sores. During a course of mercurials the patients should be kept in a moderately warm and dry, but airy chamber; and his diet should be chiefly weak broths, milk, and gruel.

The following Table shows at one view the quantity of mercury contained in each of the different ointments ordered by the British Colleges.

One drachm	of the Lond.	stronger ointment contains of merc.	30 grs.
		weaker ointment	10
	of the Edin.	common ointment	12
	of the Dub.	stronger ointment	30
		weaker ointment	20

UNGUENTUM OXIDI HYDRARGYRI CINEREI.

Edin. *Ointment of gray Oxide of Mercury.*[1]

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[1] Graue Quecksilbersalbe (*G.*)

"Take of gray oxide of mercury, *one part*; hog's lard, *three parts*. Mix."

As the whole of the mercury in this ointment is oxidized, it might, *à priori*, be supposed that it would answer all the purposes of the mercurial ointment; but it cannot be so easily introduced by friction, the oxide remaining on the surface of the cuticle after the unctuous matter is absorbed. It has, however, been too seldom employed to enable a correct judgment to be formed of its efficacy.

UNGUEN'TUM HYDRAR'GYRI NITRA'TIS. Lond. *Ointment of Nitrate of Mercury.*[1]

"Take of purified mercury, *an ounce*; nitric acid, *eleven fluid drachms*; prepared lard, *six ounces*; olive oil, *four fluid ounces*. First dissolve the mercury in the acid; then mix the solution, while it is hot, with the lard and oil melted together."

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS; vulgo, UNGUENTUM CITRINUM. Edin. *Stronger Ointment of Nitrate of Mercury.*

"Take of purified mercury, *one part*; nitrous acid, *two parts*; olive oil, *nine parts*; hog's lard, *three parts*. Dissolve the mercury in the acid; then beat up the solution strongly with the lard and oil previously melted together, and nearly cold, in a glass mortar, so as to form an ointment."

UNGUENTUM SUPERNITRATIS HYDRARGYRI. Dub. *Ointment of Supernitrate of Mercury.*

"Take of purified mercury, *an ounce*; nitrous acid, *two ounces by weight*; olive oil, *one pint*; hog's lard, *four ounces*. Dissolve the mercury in the acid; then mix the solution with the oil and lard previously melted together, and form an ointment in the same manner as the ointment of nitrous acid."

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. Edin. *Milder Ointment of Nitrate of Mercury.*

"It is made in the same manner as the stronger ointment, with a triple proportion of oil and lard."

In all of these formulæ too large a proportion of lard is used: for the excess of acid in the metallic solution oxidizing the fatty matters, occasions them to become too hard and brittle after the ointment has been kept for some time, when more than one-sixth of lard is employed. The addition of the metallic solution to the melted mixture of lard and oil should be gradual, and made in a broad flat vessel, so as to expose a large surface to the action of a current of air; while the stirring should be performed with a wooden spatula, and continued until the ointment be perfectly cold.

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[1] Onguent citrin (*F.*) Gelbe Quecksilbersalbe (*G.*) Unguento Citrino (*I.*)

When prepared in the above manner, and with one-sixth part only of lard, this ointment has a beautiful golden colour, and is of the consistence of butter, which it retains if preserved in close pots; but when made with a larger proportion of lard, it become hard, brittle, and of a pale dirty yellow hue, marbled with green blotches.

Medical properties and uses.— This ointment is stimulant and detergent. When moderately diluted with lard it is a local remedy of great efficacy in herpetic eruptions, tinea capitis, and other cutaneous eruptions. The weaker ointment may almost be regarded as a specific in psorophthalmia, in the purulent ophthalmia of infants producing ectropium, and in ulcerations of the tarsi. It is applied by taking a little on the finger, liquefying it by the fire or the flame of a candle, and applying it along the inner part of the eyelids.

UNGUENTUM GALLÆ. Edin. *Ointment of Galls.*

" Take of galls, in fine powder, *one part*; lard, *eight parts.* Mix."

This is a very useful application in pills, and has long been used, although it has never before obtained a place in the pharmacopœia.

UNGUEN'TUM HYDRAR'GYRI NIT'RICO OX'YDI. Lond. *Ointment of Nitric Oxide of Mercury.*[1]

" Take of nitric oxide of mercury, *an ounce*; white wax, *two ounces*; prepared lard, *six ounces.* Melt together the wax and lard, then add to the mixture the nitric oxide of mercury in very fine powder, and mix."

Unguentum Oxidi Hydrargyri rubri. Edin. *Ointment of red Oxide of Mercury.*

" Take of red oxide of mercury by nitric acid in fine powder, *one part*; hog's lard, *eight parts.* Mix."

Unguentum Subnitratis Hydrargyri. Dub. *Ointment of Subnitrate of Mercury.*

" Take of ointment of white wax, *half a pound*; subnitrate of mercury, *half an ounce.* Form them into an ointment."

These are excellent stimulant ointments, well adapted for giving energy to indolent foul ulcers. They are also of great use in inflammation of the conjunctiva, with a thickening of the inner membrane of the palpebræ; and to specks of the cornea. They are to be applied in the same manner as the ointment of nitrate of mercury.

UNGUENTUM HYDRAR'GYRI PRÆCIPITA'TI ALBI.[2] Lond. *Ointment of White Precipitate of Mercury.*

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[1] Rothe Quecksilbersalbe (*G.*)

[2] Unguentum e Mercurio præcipitato albo, P.L. 1745. Ung. Calcis Hydrargyri albi, P.L. 1787.

"Take of white precipitate of mercury, *a drachm*; prepared lard, *an ounce and a half.* Add the precipitated mercury to the lard previously melted by a gentle heat, and mix."

UNGUENTUM SUBMURIATIS HYDRARGYRI AMMONIATI. Dub. *Ointment of Ammoniated Submuriate of Mercury.*

"Take of ointment of white wax, *a pound*; ammoniated submuriate of mercury, *an ounce and a half.* Form them into an ointment."

These ointments are stimulant and detergent. They are recommended by Werlhoff, and some other German authors, as a remedy for itch, which may be safely used on infants; but they have been little employed in this country.

UNGUENTUM LYTTÆ.[1] Lond. *Blistering Ointment.*

"Take of blistering flies finely powdered, *two ounces*; distilled water, *eight fluid ounces*; resin cerate, *eight ounces.* Boil the water with the blistering flies to half its quantity, and strain. Mix the cerate into the strained liquor, and evaporate it to a proper consistence.

UNGUENTUM INFUSI CANTHARIDIS VESICATORIÆ. Edin. *Ointment of Infusion of Blistering Flies.*

"Take of blistering flies, resin, yellow wax, of each, *one part*; Venice turpentine, hog's lard, of each, *two parts*; boiling water, *four parts.* Macerate the flies in the water for a night, and strain the liquor, expressing it strongly; add the liquor to the fat, and boil until the water be evaporated; then add the wax and the resin, and when these are melted, remove the mixture from the fire; add the Venice turpentine, and mix."

These ointments are sufficiently mild, but they do not always succeed in keeping open a blistered surface, the purpose for which they are designed. Little efficacy can be ascribed to the blistering flies, their acrimony being nearly destroyed by the heat employed for the evaporation of the water.[2]

UNGUENTUM JUNIPERI SABINÆ. Edin. *Ointment of Savine.*

"Take of fresh leaves of savine, *two parts*; yellow wax, *one part*; lard, *four parts.* Melt the wax and lard together, then boil in them the leaves, and express through a cloth."

This ointment is intended for keeping a blistered surface discharging, and answers the same purpose as the cerate of savine.

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[1] Unguentum Cantharidis, P. L. 1787. Kantharidensalbe (*G.*)

[2] Galen employed an ointment made by macerating the entire insect in melted lard for twenty-four hours, and then straining by expression. Boerhaave proposed to boil the flies in water, then to pour off the liquid, and make an ointment of the boiled insects with the addition of lard.

UNGUENTUM CARBONATIS PLUMBI. Edin. *Ointment of Carbonate of Lead.*[1]

"Take of simple ointment, *five parts*; Carbonate of lead, *one part*. Mix."

UNGUENTUM CERUSSÆ *sive* SUBACETATIS PLUMBI. Dub. *Ointment of Cerussa*, or *Subacetate of Lead.*

"Take of ointment of white wax, *a pound*; cerussa reduced to a very fine powder, *two ounces*. Form them into an ointment."

These are useful, cooling, desiccative ointments, chiefly employed as dressings for burns.

UNGUENTUM OXIDI ZINCI IMPURI. Edin. *Ointment of impure Oxide of Zinc.*[2]

"Take of simple liniment, *five parts*; prepared impure oxide of zinc, *one part*. Mix."

UNGUENTUM TUTIÆ. Dub. *Ointment of Tutty.*

"Take of ointment of white wax, *ten ounces*; prepared tutty, *two ounces*. Form them into an ointment."

These ointments were formerly much used in ophthalmia tarsi; but they are now seldom employed.

UNGUEN´TUM PI´CIS LIQ´UIDÆ[3]. Lond. *Tar Ointment.*

"Take of tar, prepared suet, of each *a pound*. Melt them together, and strain the mixture through a linen cloth."

UNGUENTUM PICIS LIQUIDÆ. Edin. *Tar Ointment.*

"Take of tar, *five parts*; yellow wax, *two parts*. Melt the wax with a gentle heat: then add the tar, and stir until the mixture stiffens in cooling."

UNGUENTUM PICIS LIQUIDÆ. Dub. *Tar Ointment.*

"Take of tar, mutton suet, of each *half a pound*. Melt them together, and strain them through a sieve."

Although the pitch and the tar ointments differ in their sensible qualities, yet they are both applicable to the same purposes. They are used with advantage as detergents in scabby foul eruptions, and tinea capitis.

UNGUENTUM PIPERIS NIGRI. Dub. *Ointment of Black Pepper.*

"Take of prepared hog's lard, *a pound*; black pepper in powder, *four ounces*. Form them into an ointment."

We are ignorant of the purpose for which this irritating ointment is designed.

UNGUENTUM PULVERIS CANTHARIDIS VESICATORIÆ. Edin. *Ointment of the Powder of Blistering Flies.*

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[1] Onguent de Tuthie (*F.*) Unguento di Tuzia (*I.*)

[2] Onguent blanc (*F.*) Bleiweissalbe (*G.*) Unguento bianco (*I.*)

[3] Unguentum e Pice, P.L. 1745. Unguentum Picis, P.L. 1787.

"Take of resinous ointment, *seven parts*; powdered blistering flies, *one part*." Sprinkle the powder into the melted ointment: and stir the mixture until it stiffens in cooling.

UNGUENTUM CANTHARIDIS. Dub. *Ointment of Blistering Flies.*

"Take of ointment of yellow wax, *half a pound*; blistering flies in powder, *one ounce*. Form them into an ointment."

These ointments are intended for promoting a purulent discharge from blistered surfaces, and produce this effect sufficiently well when the irritation they excite can be supported, which, however cannot always be done. The flies should be reduced to a very fine powder, and very intimately mixed with the ointment.

UNGUE'NTUM RESINÆ NI'GRÆ.[1] Lond. *Black Resin Ointment.*

"Take of black resin, yellow wax, yellow resin, of each *nine ounces*; olive oil, *a pint*. Melt them together, and strain through a linen cloth."

UNGUEN'TUM SAMBUCI.[2] Lond. *Elder Ointment.*

"Take of elder flowers, prepared lard, of each *two pounds*. Boil the elder flowers in the lard, until they become crisp, then strain the ointment through a linen cloth."

Dublin.

"Take of fresh elder flowers, *three pounds*; prepared hog's lard, *four pounds*; mutton suet, *two pounds*. Make an ointment of these in the manner directed for the preparation of the savine ointment."

These ointments are simply emollient, and possess no advantages over simple ointment. They are vestiges of the redundant practice of former times.

UNGUENTUM SIMPLEX, Edin. *Simple Ointment.*

"Take of olive oil, *five parts*; white wax, *two parts*. Melt the wax in the oil; then stir the mixture until it stiffens in cooling."

An useful emollient ointment for softening the skin.

Officinal preparations. *Unguentum Oxidi Plumbi albi.* E. *Unguentum Acetatis Plumbi.* E.

UNGUENTUM SUB-ACETATIS CUPRI. Edin. *Ointment of Subacetate of Copper.*[3]

"Take of resinous ointment, *fifteen parts*; subacetate of copper, *one part*. Sprinkle the subacetate into the melted ointment and stir until the mixture stiffens in cooling."

UNGUENTUM ÆRUGINIS. Dub. *Ointment of Verdegris.*

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[1] Unguentum basilicum nigrum, vel tetra pharmacum, P. L. 1745.

[2] Unguentum sambucinum, P. L. 1720.

[3] Unguento Egiziaco (*I.*)

"Take of ointment of white wax, *a pound*; prepared verdegris, *half an ounce*. Make them into an ointment."

These ointments are escharotic and detergent. They are used as an occasional dressing to foul, flabby ulcers; and as an application to scrophulous ulcerations of the tarsi. They can scarcely be used in the undiluted state, unless to act as a caustic for taking down fungous flesh.

UNGUENTUM SULPHURIS. Lond. *Sulphur Ointment.*[1]

"Take of sublimed sulphur, *three ounces*; prepared lard, *half a pound*. Mix them."

Edinburgh.

"Take of hog's lard, *four parts*; sublimed sulphur, *one part*. Mix."

Dublin.

"Take of prepared hog's lard, *four pounds*; sublimed sulphur, *a pound*. Form them into an ointment."

These ointments are specific in itch. They should be rubbed on the body every night until the disease be cured, but not more than one-fourth part of the body should be covered with it at a time.

UNGUENTUM SULPHURIS COMPOSITUM. Lond. *Compound Ointment of Sulphur.*[2]

"Take of sublimed sulphur, *half a pound*; white hellebore root in powder, *two ounces*: nitrate of potash, *a drachm*; soft soap, *half a pound*; prepared lard, *a pound and a half*. Mix them."

This ointment is employed in the same cases as the simple ointment. It is supposed to derive more efficacy from the addition of the white hellebore, but it often excites too much irritation.

UNGUENTUM VERATRI. Lond. *Ointment of White Hellebore.*[3]

"Take of white hellebore root powdered, *two ounces*; prepared lard, *eight ounces*; oil of lemon, *twenty minims*. Mix them."

UNGUENTUM HELLEBORI ALBI. Dub. *Ointment of White Hellebore.*

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[1] Onguent soufré (*F.*) Schewfelsalbe (*G.*) Unguento Solforato (*I.*) As the smell of the sulphur ointments is objected to by many people, the following combination has been recommended.

"Take of subcarbonate of potash, *half an ounce*; rose water, *one ounce*; red sulphuret of mercury, *one drachm*; essential oil of bergamot, *half a fluid drachm*; sublimed sulphur, hog's lard, of each, *eleven ounces*. Mix them."

Bateman on Cutaneous Diseases, p. 200. note.

[2] Onguent soufré composée (*F.*) Unguento solforato composto (*I.*)

[3] Unguentum Hellebori albi, P. L. 1787.

"Take of prepared lard, *a pound*; white hellebore root in powder, *three ounces.* Make them into an ointment."

These ointments are sometimes used for the cure of scabies, when the smell of the sulphur ointment is objected to; but they are less certain remedies.

UNGUENTUM ZINCI. Lond. UNGUENTUM OXIDI ZINCI. Edin. *Zinc Ointment.*[1]

"Take of oxide of zinc, *an ounce*; prepared lard, *six ounces.* Mix them."

UNGUENTUM OXIDI ZINCI. Edin. *Ointment of Oxide of Zinc.*

"Take of simple liniment, *six parts*; oxide of zinc, *one part.* Mix."

Dublin.

"Take of ointment of white wax, *a pound*; oxide of zinc, *an ounce and a half.* Make them into an ointment."

These ointments are moderately astringent and stimulant. They are generally applied in chronic inflammation of the eye, depending on a relaxed state of the vessels: we find them also of very considerable use in sore nipples; and for removing ringworm, particularly when it attacks the scalp.

LINIMENTA.

LINIMENTS.

THESE are compositions which have the consistence of oil or balsam; so as to allow them to be easily rubbed upon the skin. They are in general more active remedies than cerates or ointments; and act as local stimulants, relieving deep-seated inflammations and pains.

LINIMENTUM ÆRUGINIS. Lond. *Liniment of Verdegris.*

"Take of verdegris powdered, *an ounce*; vinegar, *seven fluid ounces*; clarified honey, *fourteen ounces.* Dissolve the verdegris in the vinegar, and strain it through a linen cloth; then having added the honey, boil down the mixture to a proper consistence."

OXYMEL ÆRUGINIS. Dub. *Oxymel of Verdegris.*

"Take of prepared verdegris, *one ounce*; wine vinegar, *seven fluid ounces*; clarified honey, *fourteen ounces.* Dissolve the verdegris in the vinegar, and strain it through a linen cloth; add the honey, and boil the mixture to a proper thickness."

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[1] Onguent de Zinc (*F.*) Zinksalbe (*G.*) Unguento di Zinco (*I.*)

This preparation, which is improperly named a liniment by the London College, is detergent and escharotic. In the above state it is used for taking down fungous flesh; and considerably diluted is an useful stimulant to foul ulcers, which it clears and excites to a more healthy action. It has been employed as a gargle in venereal ulcerations of the mouth and fauces; but we cannot recommend it.

LINIMENTUM AMMONIÆ FORTIUS. Lond. *Stronger Liniment of Ammonia.*[1]

"Take of solution of ammonia, *a fluid ounce;* olive oil, *two fluid ounces.* Shake them together until they unite."

OLEUM AMMONIATUM. Edin. *Ammoniated Oil.*

"Take of olive oil, *eight parts*; water of ammonia, *one part.* Mix them."

LINIMENTUM AMMONIÆ. Dub. *Liniment of Ammonia.*

"Take of caustic water of ammonia, *two fluid drachms*; olive oil, *two fluid ounces.* Mix them."

In these preparations a chemical union takes place between the alkali and the fixed oil, and produces a white soap, which is kept fluid by the water of the solution of ammonia. It is an excellent rubefacient, and is efficaciously employed in cynanche tonsillaris, spread on a piece of flannel, and applied round the throat; and to relieve rheumatic pains, rubbed upon the skin over the affected part, often with the addition of a little camphor. We have found a medium proportion of solution of ammonia, or half a fluid ounce to two fluid ounces of oil, form a preparation better fitted for general use than the above.

LINIMENTUM AMMONIÆ SUBCARBONATIS. Lond. *Liniment of Carbonate of Ammonia.*[2]

"Take of solution of sub-carbonate of ammonia, *a fluid ounce*; olive oil, *three fluid ounces.* Shake them together until they unite."

This preparation is also a fluid soap, but the combination of the oil and alkali is prevented from being so perfect by the carbonic acid of the subcarbonate. It is also much less soluble in water, and after a little time, the soapy matter separates from the water. It is intended for the same purposes as the strong liniment, which can be readily rendered as mild by the addition of oil; and therefore this may be regarded as a superfluous preparation.

LINIMENTUM AQUÆ CALCIS; sive, OLEUM LINI CUM CALCE. Edin. *Liniment of Lime-Water.*

"Take of linseed oil, lime-water, of each *equal parts.* Mix them."

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[1] Liniment volatil (*F.*) Ammonium liniment (*G.*) Linamento volatile (*I.*)

[2] Linimentum volatile, P. L. 1745. Linimentum Ammoniæ, P. L. 1787.

Linimentum Calcis. Dub. *Liniment of Lime.*

"Take of lime-water, olive oil, of each *three fluid ounces.* Mix them."

These are solutions of earthy soaps, formed by the chemical union of the lime and the oil. They are thick, of a white colour, and devoid of acrimony, and are very advantageously applied to burns and scalds. The soapy matter separates from the water, when it is kept for a little time, and therefore it is always better to prepare it only when it is wanted.

LINIMEN'TUM CAM'PHORÆ. Lond. *Liniment of Camphor.*

"Take of camphor, *half an ounce;* olive oil, *two fluid ounces.* Dissolve the camphor in the oil."

Oleum Camphoratum. Edin. *Camphorated Oil.*

"Take of olive oil, *four parts;* camphor, *one part.* Mix them so as to dissolve the camphor."

Oleum camphoratum. Dub. *Camphorated Oil.*

"Take of camphor, *half an ounce*; olive oil, *two fluid ounces.* Rub them together."

These solutions of camphor in fixed oil are very useful embrocations to glandular swellings, sprains, bruises, and to joints affected with rheumatic pains. Mr. Ware recommends them with the addition of half an ounce of the solution of subcarbonate of potash, to be applied to the eye-lids night and morning in incipient amaurosis.

LINIMEN'TUM CAM'PHORÆ COMPOS'ITUM. Lond. *Compound Liniment of Camphor.*

"Take of camphor, *two ounces*; solution of ammonia, *six fluid ounces*; spirit of lavender, *a pint.* Mix the solution of ammonia with the spirit; then from a glass retort, by a gentle heat, distil a pint. Lastly, dissolve the camphor in this distilled liquor."

This is a very useful stimulant application to sprains, bruises, and rheumatic pains. It is also an excellent vehicle for introducing opium into the habit by means of friction. An embrocation composed of f ℥jſs. of this liniment, and f℥ſs. of tincture of opium, warmed and rubbed over the surface of the abdomen, very quickly allays the pains of flatulent colic.

LINIMEN'TUM HYDRAR'GYRI. Lond. *Liniment of Mercury.*

"Take of the stronger mercurial ointment, prepared lard, of each, *four ounces;* camphor, *an ounce;* rectified spirit, *fifteen minims;* solution of ammonia, *four fluid ounces.* First rub the camphor with the spirit, then with the lard and mercurial ointment: lastly, drop in gradually the solution of ammonia, and mix the whole."

This liniment is stimulant and discutient. It is employed as an embrocation to parts affected with chronic venereal pains, nodes, and tophi; to indolent swellings, and to discuss morbid collections of fluid. One drachm should be rubbed on the affected part night and morning. When largely used, it salivates sooner than mercurial ointment.

LINIMEN'TUM SAPO'NIS COMPOS'ITUM. Lond. *Compound Soap Liniment.*[1]

"Take of hard soap, *three ounces*; camphor, *an ounce*; spirit of rosemary, *a pint*. Dissolve the camphor in the spirit, then add the soap, and macerate in the heat of a sand-bath, until they be dissolved."

TINCTURA SAPONIS CAMPHORATA; vulgo, LINIMENTUM SAPONACEUM. Edin. *Camphorated Tincture of Soap*; commonly called, *Liniment of Soap.*

"Take of hard soap sliced, *four ounces*; camphor, *two ounces*; volatile oil of rosemary, *half an ounce*; alcohol, *two pounds*. Digest the soap in the alcohol for three days, then add the camphor and the oil, frequently shaking the mixture."

These preparations are stimulant and anodyne, and may be advantageously applied against local pains, and in bruises rubbed upon the parts.

TINCTURA SAPONIS ET OPII; vulgo, LINIMENTUM ANODYNUM. Edin. *Tincture of Soap and Opium*; commonly called *Anodyne Liniment.*

"Take of hard soap sliced, *four ounces*; opium, *one ounce*; camphor, *two ounces*; oil of rosemary, *half an ounce*; alcohol, *two pounds*. Digest the soap in the alcohol for three days, then to the strained solution add the camphor and the oil, frequently shaking the mixture."

The addition of the opium to the soap liniment, renders it, in many cases of rheumatism and local pains, more useful than the simple liniment.

LINIMENTUM TEREBINTHINÆ. Lond. *Turpentine Liniment.*

"Take of cerate of resin, *a pound*; oil of turpentine, *half a pint*. Melt the cerate, then add to it the oil of turpentine, and mix them."

This liniment was introduced into practice by Dr. Kentish, at that time a surgeon in Newcastle, as a dressing to burns immediately after they happen, and until the loosening of the eschars. Dr. Kentish's plan was first to bathe the parts with warm oil of turpentine, and then to apply over them plasters, thickly spread, of this liniment; at the same time that he supported the strength with wine, opium, and cordials. After the life of the parts appeared to be restored, purges were given, the cordials omitted, and mild emollient dressings applied.[1] We have had several opportunities of witnessing the good effects of this plan of treatment.

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[1] Linimentum saponaceum, P. L. 1745. Kampferliniment (*G.*)

CATAPLASMATA.

CATAPLASMS.

CATAPLASMS are in general extemporaneous preparations; but the two following formulæ are introduced into the Pharmacopœias to fix the proportions of the ingredients.

CATAPLASMA FERMENTI. Lond. *Yeast Cataplasm.*

"Take of flour, *a pound*; yeast of beer, *half a pint.* Mix, and expose the mixture to a gentle heat, until it begins to swell."

The inflation is produced by the extrication of carbonic acid gas, on which the efficacy of the cataplasm depends; and which is evolved by the heat applied to the mixture exciting the fermentative process. In this state it is applied to painful, gangrenous, or foul ulcers; and soon corrects the fœtor of the discharge, while at the same time it hastens the sloughing of the sores."

CATAPLASMA SINAPIS. Lond. *Cataplasm of Mustard.*

"Take of mustard seed, linseed, of each in powder *half a pound*; hot vinegar, *a sufficient quantity.* Mix them to the thickness of a cataplasm."

CATAPLASMA SINAPEOS. Dub. *Mustard Cataplasm.*

"Take of mustard seed in powder, crumb of bread, of each *half a pound*; vinegar, *a sufficient quantity.* Mix them, so as to make a cataplasm. This preparation may be rendered more acrid by adding two ounces of horse-radish finely scraped."

These cataplasms are powerful local stimulants, and rubefacients. They are to be spread on cloths to the thickness of about half an inch, and applied to the soles of the feet, in the low stage of typhus fever, particularly when stupor or delirium is present; and in apoplexy, coma, and other cases in which there is a great determination to the head. Their rubefacient effects are very quickly produced, and often so powerfully, as to raise blisters on the part.

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[1] *Essays on Burns*, &c. by Edward Kentish, 1797 and 1800.

TABLE,

Showing the Proportion in which Opium and certain Preparations of Iron, Antimony, Arsenic, and Mercury are contained in some compound Medicines.

OPIUM.

CONFECTIO OPII. Lond. *Confection of Opium.* Thirty-six grains contain one grain of opium.

ELECTUARIUM OPIATUM. Edin. *Opiate Electuary,* in each drachm about one grain and a half of opium.

ELECTUARIUM CATECHU COMPOSITUM. Edin. *Electuary of Catechu,* contains in each ounce about two grains and a half of opium: or one hundred and ninety-three grains contain one grain of opium.

ELECTUARIUM CATECHU COMPOSITUM. Dub. *Compound Electuary of Catechu,* contains in each ounce about two grains and a half of purified opium.

PILULÆ SAPONIS CUM OPIO. Lond. *Pills of Soap and Opium.* Five grains contain one grain of opium.

PILULÆ OPIATÆ. Edin. *Opiate,* formerly *Thebaic, Pills.* Each drachm contains six grains of opium. A pill of five grains contains half a grain of opium.

PILULÆ STYRACE. Dub. *Storax Pills* contain, in five grains of the mass, one grain of purified opium.

PULVIS CORNU USTI CUM OPIO. Lond. *Powder of Burnt Hartshorn with Opium.* Ten grains contain one grain of opium.

PULVIS CRETÆ COMPOSITUS CUM OPIO. Lond. *Compound Powder of Chalk with Opium.* Two scruples contain one grain of opium.

PULVIS IPECACUANHÆ COMPOSITUS. Lond. Dub. *Compound Powder of Ipecacuanha.* Ten grains contain one grain of opium.

PULVIS IPECACUANHÆ ET OPII. Edin. *Powder of Ipecacuanha and Opium.* Each drachm contains six grains of opium, or one grain in ten grains of the powder.

PULVIS KINO COMPOSITUS. Lond. *Compound Powder of Kino.* Each scruple contains one grain of opium.

SYRUPUS OPII. Dub. *Syrup of Opium,* contains in one fluid ounce about one grain of the watery extract of opium: for the liquor is more than doubled in bulk by the addition of the sugar.

TINCTURA OPII. Lond. *Tincture of Opium.* Nineteen minims contain about one grain of opium.

TINCTURA OPII. Edin. *Tincture of Opium,* is made with two scruples of opium in each ounce of liquid, or each drachm should contain five grains. But one drachm of the tincture when evaporated yields only three grains and a half of opium.

TINCTURA OPII. Dub. *Tincture of Opium,* contains in one fluid drachm about four grains and a half of purified opium.

TINCTURA CAMPHORÆ COMPOSITA. Lond. *Compound Tincture of Camphor.* TINCTURA OPII CAMPHORATA. Edin. Half a fluid ounce contains nearly one grain of opium.

TINCTURA OPII AMMONIATA. Edin. *Ammoniated Tincture of Opium,* is made with about eight grains of opium in each ounce of liquid; or each drachm contains nearly one grain of opium.

TINCTURA OPII CAMPHORATA. Dub. *Camphorated Tincture of Opium.* Four fluid drachms and a half contain nearly one grain of purified opium.

TINCTURA SAPONIS ET OPII. Edin. *Tincture of Soap and Opium,* is made with one scruple of opium in each ounce of the liquid.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. Edin. *Troches of Liquorice with Opium.* Each drachm contains nearly one grain of opium.

IRON.

TINCTURA ACETATIS FERRI CUM ALCOHOL. Dub. *Tincture of Acetate of Iron with Alcohol.* Each fluid drachm contains about one grain of dry acetate of iron.

ANTIMONY.

LIQUOR ANTIMONII TARTARIZATI. Lond. *Solution of Tartarized Antimony,* contains in each fluid ounce two grains of tartarized antimony.

VINUM TARTRITIS ANTIMONII. Edin. *Wine of Tartrite of Antimony,* contains in each ounce two grains of tartrite of antimony (formerly tartar emetic.)

MERCURY.

EMPLASTRUM HYDRARGYRI. Edin. *Mercurial Plaster.* Each drachm contains about sixteen grains of mercury, (fifteen grains, *Lond.*)

HYDRARGYRUS CUM MAGNESIA. Dub. *Mercury with Magnesia.* Three grains contain two of mercury.

HYDRARGYRUM CUM CRETA. Lond. *Mercury with Chalk.* Three grains contain one grain of mercury.

LIQUOR HYDRARGYRI OXYMURIATIS. Lond. *Solution of Oxymuriate of Mercury.* One fluid ounce contains half a grain of oxymuriate of mercury.

LINIMENTUM HYDRARGYRI. Lond. *Mercurial Liniment.* Six drachms contain one drachm of mercury.

PILULÆ HYDRARGYRI. Lond. Dub. *Mercurial Pills.* Three grains contain one grain of mercury.

PILULÆ HYDRARGYRI. Edin. *Mercurial Pills.* Each drachm contains fifteen grains of mercury. Each pill contains one grain of mercury.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. Lond. Edin. *Pills of Submuriate of Mercury.* About four grains contain one grain of submuriate of mercury.

UNGUENTUM HYDRARGYRI FORTIUS. Lond. Dub. *Stronger Mercurial Ointment.* Two drachms contain one drachm of mercury.

UNGUENTUM HYDRARGYRI MITIUS. Lond. *Weaker Mercurial Ointment.* Six drachms contain one drachm of mercury.

UNGUENTUM HYDRARGYRI. Edin. *Mercurial Ointment.* Each drachm contains twelve grains of mercury; made with double the quantity of mercury, each drachm contains twenty grains.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS. Edin. *Stronger Ointment of Nitrate of Mercury.* Each drachm contains four grains of mercury.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. Edin. *Milder Ointment of Nitrate of Mercury.* Each scruple contains half a grain of mercury.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. Edin. Each drachm contains fifteen grains of the oxide.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. Edin. *Ointment of Red Oxide of Mercury.* Each drachm contains seven grains of the oxide.

ARSENIC.

LIQUOR ARSENICALIS, Lond. SOLUTIO ARSENICALIS. Edin. *Arsenical Solution.* One fluid ounce contains four grains of oxide of arsenic.

TABLE

OF

NEW NAMES;

Showing to what Name of the former London Pharmacopœia each belongs.

New Names.	Former Names.
Abietis resina	Thus
Absinthium	Absinthium vulgare
Acaciæ gummi	Arabicum gummi
Acetosa	Acetosa pratensis
Acidum aceticum	Acetum distillatum
——— benzoicum	Flores benzoes
——— nitricum	Acidum nitrosum
——— sulphuricum	——— vitriolicum
Aloës spicatæ extractum	Aloë socotorina, *succus spissatus*
——— vulgaris extractum	——— barbadensis, *succus spissatus*
Ammoniæ murias	Sal ammoniacus
——— subcarbonas	Ammonia præparata
Anthemidis flores	Chamæmelum, *flos simplex*
Antimonii sulphuretum	Antimonium
——— sulphuretum præcipitatum	Sulphur antimonii præcipitatum
Argenti nitras	Argentum nitratum
Armoraciæ radix	Raphanus rusticanus, *radix.*
Benzoinum	Benzoe.
Calami radix	Calamus aromaticus, *radix*
Calamina	Lapis calaminaris
Calumbæ radix	Columba, *radix*
Cambogia	Gambogia
Canella cortex	Canella alba, *cortex*
Capsici baccæ	Piper indicum, *capsula*
Caryophylli	Caryophyllus aromatica, *pericarpium immaturum*
Cassiæ pulpa	Cassia fistularis, *fructus*
Castoreum	Castoreum rossicum
Ceratum plumbi compositum	Ceratum lithargyri acetati compositum
——— resinæ	Unguentum resinæ flavæ
Cetaceum	Spermaceti
Cinchonæ lancifoliæ cortex	Cinchonæ cortex
——— cordifoliæ cortex	*Vulgò* Cortex flavus

NEW NAMES.	FORMER NAMES
Cinchonæ oblongifoliæ cortex	*Vulgò* Cortex ruber
Coccus	Coccinella
Confectio aurantii	Conserva aurantii hispa corticis exterioris
——— cassiæ	Electuarium cassiæ
——— opii	Confectio opiatæ
——— rosæ caninæ	Conserva cynosbati
——— rosæ gallicæ	——— rosæ
——— scammoneæ	Electuarium scammonii
——— sennæ	——— sennæ
Conii folia	Cicuta, *herba*
Copaiba	Balsamum copaiva
Cupri sulphas	Vitriolum cæruleum
Cuspariæ cortex	*Vulgò* cortex angusturæ
Cydoniæ semina	Cydonii malus, *semen.*
Decoctum cydoniæ	Mucilago seminis cydonii mali
——— malvæ compositum	Decoctum pro enemate
——— papaveris	——— fomento.
Elaterii poma	Cucumis agrestis, *fructus recens*
Emplastrum ceræ	Emplastrum ceræ compositum
——— galbani compositum	
——— hydrargyri	——— lithargyri cum hydrargyro
——— picis compositum	——— picis Burgundicæ compositum
——— lyttæ	——— cantharidis
——— plumbi	——— lithargyri
——— resinæ	——— lithargyri cum resina.
Ferri sulphas	Ferrum vitriolatum
Ferrum ammoniatum	——— ammoniacale
Fœniculi semina	Fœniculum dulce, *semen.*
Hellebori fœtidi folia	Helleboraster, *folium*
Hydrargyri nitrico-oxydum	Hydrargyrus nitratus ruber
——— oxydum rubrum	——— calcinatus
——— oxymurias	——— muriatus
——— submurias	Calomelas
——— sulphuretum rubrum	Hydrargyrus sulphuratus ruber
Hydrargyrum præcipitatum album	Calx hydrargyri albi.
Jalapæ radix	Jalapium, *radix.*
Linimentum ammoniæ subcarbonatis	Linimentum ammoniæ
——— æruginis	Oxymel æruginis
Lini usitatissimi semina	Linum, *semen*
Liquor aluminis compositus	Aqua aluminis composita

NEW NAMES.	FORMER NAMES.
Liquor ammoniæ	——— ammoniæ puræ
——— ammoniæ acetatis	——— ammoniæ acetatæ
——— antimonii tartarizati	Vinum antimonii tartarizati
——— calcis	Aqua calcis
——— cupri ammoniati	——— cupri ammoniati
——— plumbi subacetatis	——— lithargyri acetati
——— plumbi subacetatis dilutus	——— lithargyri acetati composita
——— potassæ	——— kali puri
Lytta	Cantharis.
Magnesia	Magnesia usta
Magnesiæ carbonas	——— alba
——— sulphas	——— vitriolata
Marrubium	Marrubium album
Mentha piperita	Mentha piperitis
——— viridis	——— sativa
Menyanthes	Trifolium paludosum
Mistura amygdalarum	Lac amygdalæ
——— ammoniaci	——— ammoniaci
——— assafœtidæ	——— assafœtidæ
——— camphoræ	Mistura camphorata
——— cretæ	——— cretacea
——— gaiaci	Lac guaiaci
——— moschi	Mistura moschata.
Oleum succini	Oleum succini rectificatum
Oxymel simplex	Mel acetatum.
Papaveris somniferi capsulæ	Papaver album, *capsula*
Pilulæ saponis cum opio	Pilulæ opii
——— scillæ compositæ	——— scillæ
Pix arida	Pix Burgundica
Plumbi superacetas	Cerussa acetata
——— subcarbonas	Cerussa
——— oxydum semivitreum	Lithargyrus
Potassa cum calce	Calx cum kali puro
Potassa fusa	Kali purum
——— impura	Cineres clavellati
Potassæ acetas	Kali acetatum
——— nitras	Nitrum
——— subcarbonas	Kali præparatum
——— tartras	——— tartarizatum
——— sulphas	——— vitriolatum
——— sulphuretum	——— sulphuratum
——— supertartras	Tartari crystali
Pruna gallica	Pruna
Pterocarpi lignum	Santalum rubrum, *lignum*
Pulvis alöes compositus	Pulvis alöes cum guaiaco
——— cinnamomi compositus	——— aromaticus
——— cornu usti cum opio	——— opiatus.

NEW NAMES.	FORMER NAMES.
Rhœados petala	Papaver erraticum, *flos*
Rhamni baccæ	Spina cervina, *bacca*
Rhei radix	Rhabarbarum, *radix*
Rosæ caninæ pulpa	Cynosbatus, *fructus*
—— centifoliæ petala	Rosa Damascena, *petalum*
—— Gallicæ petala	—— rubra, *petalum.*
Saccharum	Saccharum non purificatum
Scammoneæ gummi resina	Scammonium, *gummi resina*
Senegæ radix	Seneka, *radix*
Serpentariæ radix	Serpentaria virginiana, *radix*
Soda impura	Barilla
—— tartarizata	Natron tartarizatum
Sodæ subboras	Borax
—— murias	Sal muriaticus
—— sulphas	Natron vitriolatum
—— subcarbonas	—— præparatum
Spartii cacumina	Genista, *cacumen*
Spiritus camphoræ	Spiritus camphoratus
—— rectificatus	—— vinosus rectificatus
—— tenuior	—— vinosus tenuior
Sulphur lotum	Flores sulphuris loti
—— sublimatum	Sulphuris flores.
Terebinthina canadensis	Balsamum canadense
Tinctura camphoræ composita	Tinctura opii camphorata
—— ferri muriatis	—— ferri muriati.
Veratri radix	Helleborus albus, *radix*
Unguentum picis liquidæ	Unguentum picis
—— cetacei	—— spermatis ceti.
Zinci oxydum	Zincum calcinatum
—— sulphas	—— vitriolatum.

TABLE

OF

FORMER NAMES;

Showing to what Name of the present London Pharmacopœia each belongs.

FORMER NAMES.	NEW NAMES.
ABSINTHIUM vulgare	Absinthium
Acetosa pratensis	Acetosa
Acetum distillatum	Acidum aceticum
Acidum nitrosum	——— nitricum
——— vitriolicum	——— sulphuricum
Alöe barbadensis	Alöes vulgaris extractum
—— socotorina	Spicatæ extractum
Ammonia præparata	Ammoniæ subcarbonas
Antimonium	Antimonii sulphuretum
Aqua aluminis composita	Liquor aluminis compositus
—— ammoniæ puræ	——— ammoniæ
—— ammoniæ acetatæ	——— ammoniæ acetatis
—— calcis	——— calcis
—— cupri ammoniati	——— cupri ammoniati
—— lithargyri acetati	——— plumbi subacetatis
—— lithargyri acetati composita	——— plumbi subacetatis dilutus
—— kali puri	——— potassæ
Arabicum gummi	——— Acaciæ gummi
Argentum nitratum	Argenti nitras.
Balsamum canadense	Terebinthina canadensis
——— capaiva	Copaiba
Barilla	Soda impura
Benzöe	Benzoinum
Borax	Sodæ subboras.
Calamus aromaticus, *radix*	Calami radix
Calomelas	Hydrargyri submurias
Calx cum kali puro	Potassa cum calce
—— hydrargyri alba	Hydrargyrum præcipitatus albus
Canella alba, *cortex*	Canellæ cortex
Cantharis	Lytta
Caryophyllus aromatica, *pericarpium immaturum*	Caryophylli
Cassia fistularis, *fructus*	Cassiæ pulpa
Castoreum rosicum	Castoreum

FORMER NAMES.	NEW NAMES.
Ceratum lithargyri acetati compositum	Ceratum plumbi compositum
Cerussa	Plumbi subcarbonas
Cerussa acetata	——— superacetas
Chamæmelum, *flos simplex*	Anthemidis flores
Cicuta, *herba*	Conii folia
Cinchona, *cortex*	Cinchonæ lancifoliæ cortex
——— *flavus*	——— cordifoliæ cortex
——— *ruber*	——— oblongifoliæ cortex
Cineres clavellati	Potassa impura
Coccinella	Coccus
Columba, *radix*	Calumbæ radix
Conserva aurantii hispalensis corticis exterioris	Confectio aurantii
——— cynosbati	——— rosæ caninæ
——— rosæ	——— gallicæ
Confectio opiata	——— opii
Cortex angusturæ	Cuspariæ cortex
Cucumis agrestis, *fructus recens*	Elaterii poma
Cydonia malus, *semen*	Cydoniæ semina
Cynosbatus, *fructus*	Rosæ caninæ pulpa.
Decoctum pro enemate	Decoctum malvæ compositum
——— fomento	——— papaveris.
Electuarium cassiæ	Confectio cassiæ
——— scammonii	——— scammoneæ
——— sennæ	——— sennæ
Emplastrum cantharidis	Emplastrum lyttæ
Emplastrum lithargyri	Emplastrum plumbi
——— lithargyri cum resina	——— resinæ
——— ceræ compositum	——— ceræ
——— lithargyri compositum	——— galbani compositum
——— lithargyri cum hydrargyro	——— hydrargyri
——— picis Burgundicæ compositum	——— picis compositum.
Ferrum vitriolatum	Ferri sulphas
——— ammoniacale	Ferrum ammoniatum
Flores benzoës	Acidum benzoicum
——— sulphuris loti	Sulphur lotum
Fœniculum dulce, *semen*	Fœniculi semina.
Gambogia	Cambogia
Genista, *cacumen*	Spartii cacumina.
Helleboraster, *folium*	Hellebori fœtidi folia
Helleborus albus, *radix*	Veratri radix
Hydrargyrus calcinatus	Hydrargyri oxydum rubrum

FORMER NAMES.	NEW NAMES.
Hydrargyrus muriatus	———— oxymurias
———— nitratus ruber	———— nitrico-oxydum
———— sulphuratus ruber	———— sulphuretum rubrum
———— e sulphure	———— sulphuretum nigrum.
Jalapium, *radix*	Jalapæ radix.
Kali acetatum	Potassæ acetas
—— purum	Potassa fusa
—— præparatum	Potassæ subcarbonas
—— sulphuratum	———— sulphuretum
—— tartarizatum	———— tartras
—— vitriolatum	———— sulphas.
Lac amygdalæ	Mistura amygdalæ
—— ammoniaci	———— ammoniaci
—— assafœtidæ	———— assafœtidæ
—— guaiaci	———— guaiaci
Lapis calaminaris	Calamina
Linimentum ammoniæ	Linimentum ammoniæ subcarbonatis
Linum, *semen*	Lini usitatissimi semina
Lythargyrus	Plumbi oxydum semivitreum.
Magnesia alba	Magnesiæ carbonas
———— usta	Magnesia
———— vitriolata	Magnesiæ sulphas
Marrubium album	Marrubium
Mel acetatum	Oxymel
Mentha piperitis	Mentha piperita
———— sativa	———— viridis
Mistura camphorata	Mistura camphoræ
———— cretacea	———— cretæ
———— moschata	———— moschi
Mucilago seminis cydonii mali.	Decoctum cydoniæ.
Natron præparatum	Sodæ subcarbonas
———— tartarizatum	Soda tartarizata
———— vitriolatum	Sodæ sulphas
Nitrum	Potassæ nitras
Oleum succini rectificatum	Oleum succini
Oxymel æruginis	Linimentum æruginis.
Papaver album, *capsula*	Papaveris somniferi capsulæ
———— erraticum, *flos*	Rhœados petala
Pilulæ opii	Pilulæ saponis cum opio
———— scillæ	———— scillæ composita
Pix Burgundica	Pix arida
Pulvis alöes cum guaiaca	Pulvis alöes compositus
———— aromaticus	———— cinnamomi compositus

FORMER NAMES.	NEW NAMES.
Pulvis opiatus - - - - - - -	——— cornu usti cum opio
Pruna - - - - - - - - -	Pruna gallica.
Raphanus rusticanus, *radix* - -	Armoraciæ radix
Rhabarbarum, *radix* - - - -	Rhei radix
Rosa Damascena, *petalum* - -	Rosæ centifoliæ petala
—— rubra, *petalum* - - - -	——— gallicæ petala.
Saccharum non purificatum - -	Saccharum
Sal ammoniacus - - - - - -	Ammoniæ murias
—— muriaticus - - - - - - -	Sodæ murias
Santalum rubrum - - - - - -	Pterocarpi lignum
Scammonium, *gummi-resina* - -	Scammoneæ gummi-resina
Seneka, *radix* - - - - - -	Senegæ radix
Serpentaria virginica, *radix* - -	Serpentariæ radix
Sperma ceti - - - - - - - -	Cetaceum
Spina cervina, *bacca* - - - -	Rhamni baccæ
Spiritus camphoratus - - - -	Spiritus camphoræ
——— vinosus rectificatus - -	——— rectificatus
——— vinosus tenuior - - -	——— tenuior
Sulphur antimonii præcipitatum	Antimonii sulphuretum præcipitatum
Sulphuris flores - - - - -	Sulphur sublimatum.
Tartari crystalli - - - - - -	Potassæ supertartras
Tinctura opii camphorata - -	Tinctura camphoræ composita
——— ferri muriati - - - -	——— ferri muriatis
Thus - - - - - - - - - -	Abietis resina
Trifolium paludosum, *herba* - -	Menyanthes.
Vinum antimonii tartarizati - -	Liquor antimonii tartarizati
Vitriolum cæruleum - - - -	Cupri sulphas
Unguentum picis - - - - -	Unguentum picis liquidæ
——— resinæ flavæ - -	Ceratum resinæ flavæ
——— spermatis ceti - -	Unguentum cetacei.
Zincum calcinatum - - - - -	Zinci oxydum
——— vitriolatum - - - -	—— sulphas. *

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* This table and the foregoing are copied from Dr. Powell's Translation of the London Pharmacopœia.

APPENDIX.

N° I.

OF WATER.

WATER is an agent of great importance, independent of the part it sustains in the magnificent operations of Nature. Its efficacy in the cure of diseases is indubitable; yet it is not admitted into the list of materia medica of any of the British Pharmacopœias, either in the state in which it is most commonly procured, or that in which it holds in solution substances from which it receives new properties, and is rendered capable of producing important changes in the animal œconomy. In the first state it is denominated COMMON WATER; in the second, MINERAL WATER: and under both of these forms, it is necessary that its qualities and effects should be known to the medical practitioner.

I. COMMON WATER.

The usual appearance of water is too well known to require description. It retains its fluidity under the ordinary pressure of the atmosphere, at any degree of temperature between 32 and 212°[1], Fah.: but under 32° it crystallizes and becomes solid, or is changed into ice; and above 212°[2] assumes an aëriform character, or becomes steam, expanding to 1698 times its ordinary bulk. One cubic inch of pure water at 60°, and under a pressure of the atmosphere indicated by 30° of the barometer, weighs 252·422 grains, or $\frac{1}{33}$dth of a grain less than two hundred and fifty-two grains and a half.

Although water is almost universally diffused over the surface of the earth, yet it is not found perfectly pure in any place; which is owing to its great solvent powers enabling it to take up a portion of many things with which it must come into contact in its natural state. These impregnations, however, are not sufficient in general to give it any very sensible taste or odour, or to render it unfit for the ordinary purposes of life; and it is in this state that common water is usually obtained. Common water varies considerably according to the source whence it is derived, and other circumstances; but all the varieties may be reduced under the three following heads:

1. Rain Water—*Aqua pluvialis.*
2. Spring Water—*Aqua fontana.*
3. River Water—*Aqua fluviatilis.*

1. RAIN WATER is the purest kind of natural water; but it, nevertheless, contains in solution, in every 100 cubic inches, about 3½ cubic inches of air, rather more oxygenous than common atmospherical air, and about one cubic inch of carbonic acid gas, besides minute portions of carbonate of lime and muriate of lime. Its specific gravity scarcely differs from that of distilled water; and after precipitating the muriate of lime, by dropping into it a little barytic water, and exposing it to the atmosphere until the precipitate be totally deposited, it is sufficiently pure for most pharmaceutical purposes.[3] When rain water, however, is collected in towns, or from the roofs of houses, it contains a small portion of sulphate of lime, soot, and other impurities, and requires to be boiled and filtered before dropping in the barytic water.

Snow water, when newly melted, is destitute of air, which is the reason that fish cannot live in it; but when allowed to remain for some time exposed to the atmosphere, it does not differ in its qualities from rain water.

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[1] This degree varies according to the pressure of the atmosphere. Thus, in Gemmilaro's hut, on the side of Etna, about 11332 feet from the level of the sea, Dr. Irvine found that water boiled at 191°. Vide *Letters on Sicily*, 8vo. p. 153.

[2] Guy Lussac.

[3] Morveau, *Annales de Chimie*, xxiv. 320.

2. SPRING WATER, if it has not filtered through a very soluble soil, is almost as pure as rain water. The best springs are those which rise through sand or gravel, at a small depth.[1] It generally contains, besides the above-mentioned ingredients, a small portion of muriate of soda.

Well or pump water, which is spring water obtained by digging to a considerable depth, is by no means so pure. It is commonly distinguished by a property named hardness, implying an incapability of dissolving soap [2]; which is owing to its containing many earthy salts, the principal of which is sulphate of lime. It, also, contains more carbonic acid gas than common spring water. Many of the foreign ingredients contained in hard water are simply suspended in it; for pump water is rendered softer and purer by only passing it through a filtering stone. The best mode of freeing hard water of its earthy salts, is first to boil it; then, after it has cooled, to drop into it an alkaline carbonate; and lastly, to filter it. It cannot be employed for pharmaceutical purposes.

3. RIVER WATER, when the stream is rapid, and runs over a pebbly or siliceous channel, is as pure as the softer spring water; but when the current is slow, and the bed clayey, it approaches nearer to the nature of well water, and frequently contains putrefied vegetable and animal matters, as is generally the case in the water of lakes and marshes.

Such are the foreign ingredients contained in *common water.* Boiling frees it from air and gases, and precipitates many of the earthy salts: but distillation in glass vessels frees it entirely from them, and it is obtained almost perfectly pure, transparent, colourless, insipid, and inodorous.

The varieties of water enumerated above may be almost indiscriminately employed as diluents, the small proportion of foreign ingredients they contain, occasioning no difference in their diluent properties. When the quantity of sulphate of lime and aluminous matter, however, is very considerable, as is the case in many pump waters, there is some reason for concluding that deleterious effects may arise from the use of the water; although it may be doubted whether the scrophulous and glandular swellings, peculiar to some populous towns, can be justly ascribed to this cause.[3] Even a few of the waters which are regarded as mineral waters owe more to the diluent property of the water for their efficacy, than to the impregnations they contain. This is particularly the case with the Malvern spring, which has been found to contain very little foreign matter. The diluting power of water is much modified by temperature; warm or tepid water being a much better diluent than cold water.

The medicinal properties of water as a diluent were well known to the ancients; and cold water, used as a drink in fevers, was the principal remedy of the father of physic in these complaints. The temperature of 60° is the proper degree, when it is intended that water should produce its diluent effects without the aid of heat. Under 45° it produces a sedative and astringent effect; above 60° and under 100°, it relaxes the fibres of the stomach, and is apt to induce nausea, particularly when bulk is added to this range of temperature; but at a higher temperature, the stimulus of heat, in the same manner as the addition of other stimulants, prevents that effect. Simple water may supersede the use of all other diluents; but animal and vegetale infusions are generally employed, or toast and water (*infusum panis tosti*), which is more agreeable to most palates, and is an excellent diluent in fevers and inflammatory diseases. The temperature of water as a diluent should be regulated by the nature of the disease: in internal hæmorrhagies the temperature should not exceed 45°, but it may be 60° in fevers; unless in the cold stage of the paroxysm of fever, when thirst should be allayed by tepid or warm water, or other bland fluids; and the same precaution is necessary when the sweat has become general and profuse. In cases in which there exists a morbid increase of bile disturbing the functions of the stomach and irritating the bowels, the temperature of the water used as drink may be from 90° to 114°; and in some cases of dyspepsia, which are attended with the sensation of coldness at the stomach, and with cold extremities, a cupful of water, taken as hot as it can be drunk, affords very considerable relief. In cases of redundant bile, by drinking half a pint of tepid water every morning before breakfast, and taking immediately afterwards moderate exercise, the acrid bile is diluted, and its passage through the bowels assisted, without the irritation, which in its undiluted state it always excites; and it produces the same benefit in cholera morbus in the commencement of the disease, the stomach being rendered by it more fit to receive opiates and other remedies. Some medicines, as sudorifics, diuretics, and emetics, scarcely produce their effects, unless their operation be assisted by copious dilution with water, or watery fluids.

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[1] The water conveyed to Hodsdon, in Hertfordshire, rises through a fine white sand, and is so pure that Dr. Hales affirms it left no incrustation in a boiler which had been in constant use for fifteen years. *Statical Essays,* ii. 242.

[2] Soap when agitated with hard water is decomposed; the alkali of the soap uniting with the acid of the earthy salts, while the oil and earths combine, and form new nearly insoluble soaps, which swim in a curdy form on the surface of the water.

[3] Percival ascribes the glandular swellings common in Manchester to this cause. See *Essays,* i. 291.

Water is also an external remedy of great importance, but its effects are much modified by the degree of temperature at which it is applied.

COLD WATER, or of a temperature under 70°, gives the sensation of cold to the skin, and is applied under the form of *bath* and of *affusion.*

The cold Bath, (*balneum frigidum,*) is water of any temperature, from 42° to 85° of Fahrenheit. When the body is immersed in it, it first induces the sensation of cold, excites shivering, renders the skin pale, and contracts it so as to produce the papillous appearance denominated goose skin (*cutis anserina*); the respiration at the same time is quickened and rendered irregular, producing sobbing; and the pulse is diminished in force and velocity, but is also rendered firmer and more regular. If the immersion be not long continued, re-action takes place on coming out of the bath, a glow, or agreeable sensation of heat, is felt over the whole body, the tone and vigour of the muscles are increased, a buoyancy of spirit and aptitude for action succeed, and a sense of general refreshment is experienced by the bather. The protraction, however, of the immersion for a considerable space of time, particularly if the temperature of the bath be under 50°, is not followed by this re-action, but the cold water operates as a powerful sedative; the action of the heart and arteries becomes languid, the pulse ceases at the wrist, the animal heat is rapidly diminished, and a sensation of coldness at the stomach is felt, which is succeeded by faintness, delirium, torpor, and death. Sometimes these unpleasant effects are experienced in some degree, even when the immersion is not protracted, and the temperature of the bath is not under 60°; in which case cold bathing proves always hurtful, and ought not to be repeated: but when the contrary effects are experienced, it is found to be useful in many diseases of debility, particularly in scrophula, if the water be impregnated with salt, or sea-bathing be resorted to. The debilitated, however, in whom the use of sea-bathing produces these effects, when it is employed before breakfast, are not always affected in the same manner when it is used after breakfast, or when the stomach is full: but on the contrary receive the same benefit from it as those with whom it agrees at all times. The use of cold water as a general bath is never employed with a view of producing its sedative effects: but for this purpose it is partially applied, either by the immersion of the affected parts, or by means of cloths dipped in very cold water, and laid over or near the parts. It is used as a remedy in active uterine hæmorrhagies, burns and scalds, and in local inflammations, even when arising from general disease, as gout and acute rheumatism, when the surface of the pained part appears red and inflamed.

The cold affusion, or the suddenly pouring cold water over the whole surface of the body, operates as a powerful remedy, although its effects as such are of short duration. They are produced by the suddenness of the application affecting the nervous energy, and by the shock rousing the dormant sensibility, so as to induce a new action, as it were, of the nervous system, dissolving the spasm on the extreme vessels of the surface, carrying off a large portion of morbid heat by general evaporation, and the remainder by insensible perspiration; thence restoring the healthy action of the exhalants and the capillaries. In typhus fever this mode of applying cold water has been productive of the best effects.[1] It should be applied in the first hot stage of the disease, if possible, and repeated every time the morbid heat returns. If the water can be impregnated with salt, so much the better; but when the disease is advanced, its temperature should not be more than 26°[1] under the heat of the body. It often stops suddenly the disease, if it be used during the three first days, and sometimes so late even as the fifth; but after this period it can be regarded as an useful auxiliary only even when properly employed. In tetanus, Currie affirms[2] that the cold affusion also proves useful, particularly when the shock is considerable, and applied during the convulsions. It is, however, in idiopathic tetanus only that it proves useful, no advantage being obtained from using it in tetanus arising from wounds.[3] Its utility has also been proved in many of the exanthemata; for instance, during the hot stage of the eruptive fever of small-pox; and we can bear ample testimony to its efficacy in scarlatina maligna, when the heat rises to above 100°.[4] This remedy, however, is productive of much mischief when misapplied; and therefore it is necessary to observe that it is contra-indicated in the cold stage of fevers, and when a sense of chilliness is present, although the thermometer indicate the real heat to be more than natural. It is also said to be improper in fevers, when diarrhœa or dysentery are present; after the sweating stage in intermittents is formed; after the eruption is completely formed in confluent small-pox; and in symptomatic fever occasioned by great local inflammation: but Dr. Nicoll has found it useful in India, in remittent and intermittent fevers accompanied with *dysentery;* when the heat of the surface has exceeded 98° Fahrenheit; for as in these cases the dysenteric symptoms seem to depend on the degree of febrile excitement, the cold water, by producing a solution of these, allays the griping and tenesmus, and natural stools follow. The affusion should always, in such cases, be preceded by bleeding and other depletory[5] means. The water should be dashed from a height of ten or twenty feet; and its temperature should be nearly that of the air at the time. The cold affusion, in the form of the shower-bath, is advantageously employed as a stimulant and tonic in diseases of general debility, when no fever or increased heat is present. I know of no remedy so generally useful in those affections which are known by the name of nervous complaints.

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[1] The cold affusion was employed by Antonius Musa, physician to Augustus, when that emperor was affected with a bowel complaint, which had resisted every other remedy. *Vide Q. Horatii F. Epistol. lib.* xv. *ad Num. Valam. C. Sueton. Tranq. Octavius Aug.* ii. *cap.* 81. *p.* 104. Cold affusions in the fevers of Asia are also prescribed by the Koran, and used in India by the Mahomedan and Hindoo physicians in various diseases.

WARM WATER, or of a temperature from 86° to 100°, gives the sensation of warmth to the body, and is applied both locally and generally, in the form of vapour, fomentation, and bath. Water is found in a state of nature combined with different quantities of caloric within the above range of temperature. In the Buxton hot springs the temperature is about 82°; at Bristol it is from 76° to 84°; and at Bath the range is from 110° to 114°.[6] The necessary degree of temperature, however, is generally obtained by artificially heating the water.

The general application of warm water is obtained by means of baths. When the greater part of the entire body is immersed, the water constitutes properly a bath (*balneum*); but when half only is immersed, it is a half bath (*semicupium*). These may be either,

a. The hot bath (*balneum calidum*), from 97° to 100°.
b. The tepid bath (*balneum tepidum*), from 86° to 97°.
c. The vapour bath (*balneum vaporis*), from 100° to 130°.

The two first differ in temperature only; but the last, from the water being applied in a very minutely divided state, acts with much greater effect than water in the liquid form. The operation of the first of these forms of applying water is stimulant; it augments the action of the heart and arteries, renders the skin red, quickens respiration, and produces a copious flow of sweat: but the others, although they excite the sensation of heat, yet lessen the frequency of the pulse, relax powerfully the skin and simple solids, and diminish generally increased excitement. It has been a question of some interest, whether water be ever taken into the body by the cutaneous absorbents? That it is taken in has been denied by many philosophers, and facts brought forward to support the opinion. Dr. Currie and Dr. Pearson, after half an hour's immersion in the Buxton bath, at 82°, found that the weight of the body was rather diminished than increased;

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[1] Currie—*Reports on Cold Water*, i. 31. [2] *Ibid.* i. 138. [3] *Ibid.* i. 159.

[4] Currie gives the following results of the affusion:—The heat of the body in fever, as indicated by the thermometer, being 103°, was by it reduced to 98° in half an hour; and the pulse from 112 to 80 beats, (vol. i. 22.); the heat 101° was reduced to 99°; and the pulse from 112 to 98 in the same time. The heat 106° was reduced to 98°; and the pulse from 130 to 90. Vol. i. 46.

[5] *Lond. Med. Repository*, vol. ix. p. 123.

[6] The temperature of the Cross Bath pump is 110°; the King's Bath, 112°; and the Hot Bath, 114°.

and in a case of disphagia, in which neither food nor drink was taken by the mouth for a considerable time, the patient, when put into the tepid bath, felt his thirst alleviated, and received much comfort, without his weight being at all increased. Dr. Currie supposed, that the abatement of thirst in this case arose from the relaxation of the exhalants of the surface produced by the bath, and those of the stomach sympathizing: and that although the exhalants terminate by open mouths, which pierce the epidermis, yet as the mouths of the absorbents terminate under it, and do not come into contact with the open air; so while the epidermis remains unirritated and entire, no absorption of fluid can therefore take place from the surface. Many experiments made by Seguin are also in favour of the opinion that no cutaneous absorption is effected in the bath. Among others, he immersed venereal patients in baths containing oxymuriate of mercury in solution, and found that while the cuticle remained entire, no salivation, nor other effect of the mercury on the system, was apparent; but the specific effect of the remedy always took place when the epidermis was injured or destroyed, as in itch. It must, however, be observed, that in the case of disphagia the urine flowed as if drink had been taken by the mouth; a circumstance which Currie supposes to depend on the absorption from the atmosphere by the lungs. This, however, is an assumed position; the free exhalation from the lungs is evident, but it is by no means proved that any absorption takes place. It is true that the weight of the body in the above case was diminished; but from the sum of this loss we must abstract the cutaneous exhalation of the part of the body not immersed, the pulmonary exhalation, and the weight of the egesta; and were a supposition to be admitted as argument, it might be suggested that the relaxant power of the warm water acting on the epidermis as on inert matter, may open a way through it to the mouths of the absorbents. The question is still undecided, and fortunately it is not of much importance in a practical point of view.

Warm and vapour baths[1] are efficaciously employed in acute rheumatism, inflammation of the abdominal viscera, of the kidneys, bladder, and uterus; in suppression of urine, and in spasmodic affections, particularly those to which infants are liable, arising from dentition and other irritations. The general relaxation produced by their use has been taken advantage of, also, for assisting the reduction of strangulated hernia; for, although the effect be not topical as it regards the hernial tumour, yet the general relaxation produced gives a disposition to all the parts to regain their proper place. The tepid bath is found to be very useful in the rigidities which follow some acute diseases, as gout and rheumatism, nodosities of the joints[2], and, according to some, the rigidities attendant on old age.[3] Its effects in promoting the natural excretions by the skin render it very serviceable in promoting the cure of herpetic eruptions; in slight cases of lepra the use of it with friction is all that is required; and in all cutaneous foulnesses it is a most important auxiliary. It has, also, been found very beneficial in cases of insanity. In general the period of immersion should not be less than twenty minutes, nor exceed one hour.[4]

The partial application of warm water as a remedy is made by means of

1. *a.* The foot bath (*pediluvium*);
   b. The hip bath (*coxæluvium*); and
   c. The hand bath (*manuluvium*).

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[1] A very simple and convenient vapour bath for military practice has been recommended by my friend Dr. A. Nicoll. It may be formed of a common beer or spirit barrel, with a false bottom, placed about a foot from the bottom of the cask, that is, the end on which it is standing, and perforated with numerous small holes. A gun barrel connected with the spout of a tea-kettle placed on a fire, is to be introduced into an opening in the side of the cask between the real and false bottom; and the patient, being seated on the false bottom, the steam or vapour from the boiling kettle soon surrounds him by rising through the holes. It must be prevented from escaping by means of a blanket, which should cover the open end of the cask, and apply closely round the neck of the patient.

[2] Haygarth, *Clinical History of Diseases*, 8vo. Lond. 1805.

[3] Tepid bathing with friction is said by one author, "vitam sæpe per plures menses, interdum etiam per aliquot annos, protraxisse." — Gregory, *Conspectus Med.* ii. 100.

[4] The Arabian physicians used the vapour bath in a singular mode, in scrophulous affections, which they denominated Bother, "ponatur sub puero olla plena aquâ calidâ, in principio apparitionis pustularum, ut attrahat ab interioribus superfluum humorem ad corporis superficiem." *Rhazes de Morbis Infant.* cap. 19. by Willan, p. 31.

2. *d.* Fomentations of vegetable decoctions; and
e. Flannel cloths wrung out of boiling water, by which the moisture is applied in a state of vapour.

These partial baths are useful in the same diseases for which the general baths are employed; but are better adapted for relieving the rigidity of single joints, and topical inflammation; and the hip bath has lately been found to be very beneficial in suppressed menstruation, and for relieving the pains of cancer in utero.

For fomentations it is the practice to employ vegetable decoctions; but the best of these can be regarded only as vehicles for retaining the heat and moisture. At all times, flannel cloths wrung out of boiling water are superior; both because the water is applied in the form of vapour, and also, while they continue as long warm, they do not wet the bed and linen of the patient. The flannel cloths should be each about two yards long, with the ends sewed together; so that by means of two sticks, one being at each end, turned in opposite directions, they may be wrung much dryer, when taken out of the boiling water, than could be effected by the hands. The principal circumstance to be attended to in the application of fomentations is the frequent renewal of them, in order that a steady and constant heat may be applied to the fomented part.

II. MINERAL WATERS.[1]

It has been already noticed, that although no natural water is found in a state of absolute purity, yet that in general the quantity of foreign matters is not sufficient to give it any very sensible taste or odour. In some instances, however, these are so considerable, and of such a nature, as to prevent the water from forming a part of the nourishment of animals; in which case it is denominated a MINERAL WATER, and can be useful to mankind only in a medicinal point of view.

The substances found in mineral waters may be arranged under four heads.

I. AIR and GASES:
1. Atmospheric Air, (*very common.*) It is generally in the proportion of $\frac{1}{28}$ of the bulk of the water.
2. Oxygen Gas. (*rare*)[2]
3. Azotic Gas. (*Buxton*[3], *Harrowgate*[4], *Lymington Priors.*)[5]
4. Sulphureted Hydrogen Gas, (*Harrowgate, Moffat.*)

II. ACIDS, in a free state:
1. Carbonic Acid, (*very common.*)[6]
2. Sulphurous Acid, (*some hot springs in Italy.*)
3. Boracic Acid, (*some lakes in Italy.*)

III. ALKALIES and EARTHS:
1. Soda, (*Geyzer, Rykum, hot springs in Iceland.*)[7]
2. Silica, (*Geyzer, Rykum, Carlsbad, Pongues, Pu.*)[8]
3. Lime, (*doubtful.*)

IV. COMPOUND SALTS:
1. Sulphate of Soda, (*very common.*)
2. ——— Ammonia, (*some volcanic springs.*)
3. ——— Lime, (*very common.*)[9]
4. ——— Magnesia, (*Epsom and many other springs.*)[10]
5. ——— Alumina, (*very rare.*)
6. ——— Iron, (*volcanic springs.*)
7. ——— Copper, (*waters from copper mines.*)
8. Nitrate of Potash, (*some springs in Hungary, rare.*)
9. ——— Lime, (*some springs in Arabia.*)[11]
10. ——— Magnesia, (*rare.*)
11. Muriate of Potash, (*Uhleaborg, Sweden, rare.*)[12]
12. ——— Soda, (*very common.*)
13. ——— Ammonia, (*some springs in Italy and Siberia.*)
14. ——— Barytes, (*very uncommon.*)
15. ——— Lime, (*very common.*)

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[1] The greater part of the chemical observations on mineral waters has been taken from Thomson's System of Chemistry.

[2] First detected by Scheele. [3] Dr. Pearson. [4] Dr. Garnet. [5] Dr. Lambe. [6] Dr. Brownrigg. [7] Dr. Black. [8] Dr. Bergman. [9] Dr. Lister, in 1682. [10] Dr. Grew, in 1610. [11] Dr. Home, in 1756. [12] Julin.

16. Muriate of Magnesia, *(very common.)*
17. ——— Alumina, *(uncommon.)* [1]
18. ——— Manganese, *(Lymington Priors.)* [2]
19. ——— Carbonate of Potash, *(rare.)*
20. ——— Soda, *(very common.)*
21. ——— Ammonia, *(rare.)*
22. ——— Lime, *(very common.)*
23. ——— Magnesia, *(very common.)*
24. ——— Alumina, *(doubtful.)*
25. ——— Iron, *(common.)*
26. Hydrosulphuret of Lime. } *(not uncommon in sulphureous springs.)*
27. ——————— Soda. }
28. Sub-borate of Soda, *(lakes in Persia and Thibet.)*

These substances are not all contained in any mineral water, seldom more than five or six being present together; and they are generally in very minute quantity, the character and properties of the water depending on one or two ingredients which predominate. This allows mineral waters to be arranged into the four following classes: 1. ACIDULOUS WATERS; 2. CHALYBEATE WATERS; 3. SULPHUREOUS WATERS; 4. SALINE WATERS. We shall first give a sketch of the physical characters and medicinal properties of each of these classes; and then describe the method of determining the ingredients, and their proportions, contained in any mineral water.

1. ACIDULOUS WATERS—owe their properties chiefly to carbonic acid. They sparkle when drawn from the spring, or when poured into a glass; have an acidulous taste, and become vapid when exposed to the air. Besides free carbonic acid, on the presence of which these qualities depend, acidulous waters contain generally also carbonates of soda, of lime, of magnesia, and of iron; and sometimes muriate of soda. They may be divided into *thermal* or *warm acidulous waters*, and *cold acidulous waters*; the temperature of the former, however, does not exceed 72°, while that of the latter is generally about 55°.

The most celebrated springs of this class are Pyrmont, Seltzer, Spa, and Carlsbad. They are tonic and diuretic; and in large doses produce a sensible degree of exhilaration. They all afford a grateful and moderate stimulus to the stomach; but the Pyrmont, Spa, and Carlsbad, containing carbonate of iron, are especially useful in all cases of impaired digestion; while those which contain alkaline carbonates, as the Carlsbad and Seltzer, are more particularly employed as palliatives in calculous affections.

2. CHALYBEATE WATERS—owe their properties to iron in combination generally with carbonic acid; and as this is usually in excess, they are often acidulous as well as chalybeate. The metal is found also in the form of a sulphate, but the instances of this are very rare.

Chalybeate waters have a styptic or inky taste; they are, when newly drawn, transparent, and strike a black with tincture of nut-galls; but an ochrey sediment soon falls, and the water loses its taste. If the iron be in the state of sulphate, however, no sediment falls; and the black colour is produced by the above test, even after the water has been boiled and filtered. There are many chalybeates in Great Britain; but the most celebrated are Tunbridge, Brighton, and Peterhead: the Cheltenham spring also contains carbonate of iron; but on account of the large proportion of saline matter, and its strong purgative properties, it is not ranked in this class. The Spa springs also belong to this class.

Chalybeate waters are powerful tonics, and are employed in dyspepsia, scrophulous affections, cancer, amenorrhœa, chlorosis, and the other diseases of debility for which the artificial preparations of iron are used. Much of the benefit derived from the use of chalybeate waters depends on the extreme division of the metallic salts they contain, as well as the vehicle in which it is held in solution; while at the same time their operation is much modified by the carbonic acid by which the iron is suspended. When the water is a carbonated chalybeate, the water should be drank the moment it is drawn from the spring: but the same precaution is not necessary with those containing sulphate of iron.

3. SULPHUREOUS WATERS—derive their character chiefly from sulphureted hydrogen gas; which in some of them is uncombined, while in others it is united with lime or an alkali. They are transparent when newly drawn from the spring, and have the

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[1] Dr. Withering.

[2] Bergman.

fœtid odour of rotten eggs, which is gradually lost from exposure to the air, and the water becomes turbid. When they are strongly impregnated with the gas, they redden infusion of litmus, and exhibit some other of the characteristics of acids; and even in a weak state blacken silver and lead. Besides containing sulphureted hydrogen gas, they are not unfrequently, also, impregnated with carbonic acid. They generally contain muriate of magnesia or other saline matters, which modify their powers as a remedy.

The most important sulphureous springs in this island are those of Kilburn, Harrowgate, and Moffat; on the continent Aix la Chapelle and Barege; which are resorted to chiefly for the cure of cutaneous eruptions, and are applied locally as well as drunk. They are slightly sudorific and diuretic, and are apt to occasion in some patients head-ach of short duration, directly after they are drunk. The are also employed for curing visceral and scrophulous obstructions, torpor of the intestines, and some dyspeptic and hypochondriac cases.

4. SALINE MINERAL WATERS — owe their properties altogether to saline compounds. Those which predominate, and give their characters to the waters of this class, are either,

1. Salts, the basis of which is lime;
2. Muriates of soda and magnesia;
3. Sulphate of magnesia;
4. Alkaline carbonates; particularly carbonate of soda.

They are mostly purgative, the powers of the salts they contain being very much increased by the large proportion of water in which they are exhibited. The most celebrated saline springs are those of Cheltenham and Leamington, in England; Pitcaithly, in Scotland; and Sedlitz, on the Continent. They are employed in diseases which require continued and moderate intestinal evacuations; such as dyspepsia, hypochondriasis, chronic hepatitis, jaundice, and strumous swellings. They are more grateful to the stomach when carbonic acid also is present; and when they contain iron, as in the case of the Cheltenham spring, their tonic powers combined with their purgative qualities render them still more useful in dyspeptic complaints and amenorrhœa.

To this class the water of the ocean belongs. The quantity of saline matter SEA WATER contains varies in different latitudes: thus between 10° and 20° it is rather more than $\frac{1}{24}$th; at the equator it is $\frac{1}{25}$th; and at 57° north it is only $\frac{1}{27}$th. The saline ingredients in 10,000 parts of sea water, according to the last analysis of Dr. Murray[1], are, muriate of soda, 220·01; muriate of lime, 7·84; muriate of magnesia, 42·08; and sulphate of soda, 33·16. When brought up from a great depth, its taste is purely saline; but when taken from the surface it is disagreeably bitter, owing perhaps to the animal and vegetable matters suspended in it. Its specific gravity varies from 1·0269 to 1·0285; and it does not freeze until cooled down to 28·5° Fahrenheit. Its medicinal properties are the same as those of the saline purging waters, but more powerful; and as a bath, its efficacy is much superior to that of fresh water.

The general effects of mineral waters are modified by temperature, whether they be taken internally, or externally applied. In some springs, as those of Bath, Matlock, and Buxton, their virtues depend almost altogether on temperature; and in others, as Malvern, which has been found to contain scarcely any foreign matter, the simple diluent power of the pure water seems to produce the benefit that results from drinking them. Some of the good effects of all of them, however, must be allowed to proceed from change of scene, relaxation from business, amusement, temperance, and regular hours; and in these circumstances the drinking the waters at the springs possesses advantages which cannot be obtained from artificial waters, however excellent the imitations may be; nor even from the natural waters when bottled and conveyed to a distance from the springs.

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[1] *Edinburgh Transactions*, vol. viii. p. 205. The water was taken from the Frith of Forth, and was of the specific gravity 1·029.

Table of the more celebrated Mineral Waters, showing the Ingredients contained in a given Quantity of each Water.

Names of the Springs.		Quantity of Water.	Gases.				Carbonates of				Sulphates of				Muriates of				Silica.	Alumina.	Resins.	Temperature.
			Oxygen.	Carbonic Acid.	Sulph. Hydr.	Nitrogen.	Soda.	Lime.	Magnesia.	Iron.	Soda.	Lime.	Magnesia.	Iron.	Soda.	Lime.	Magnesia.	otas h.				
		grains.	cubic inches.	cubic inches.	cubic inches.	cubic inches.	grs.	grs.	grs.	grs.	grains.	grains.	grs.	grs.	grains.	grs.	grs.	grs.	grs.	grs.	grs.	
Acidulous.	Seltzer [1]	8949	·435	13·068	—	—	5·22	78·3	6·32	—	—	—	—	—	13·74	—	—	—	—	—	—	cold
	Pyrmont [1]	8950	—	19·6	—	—	—	4·3	9·8	0·70	—	8·38	5·44	—	1·7	—	—	—	—	—	—	cold
	Spa [1]	8933	—	9·8	—	—	1·85	1·85	4·35	0·70	—	—	—	—	0·21	—	—	—	—	—	—	cold
	Carlsbad [2]	25320	—	50·	—	—	38·5	12·5	—	0·1¼	66·75	—	—	—	32·5	—	—	—	2·25	—	—	165°
	Kilburn [10]	138240	—	84·	36·	—	—	2·4	1·25	·3¼	18·2	13·0	91·0	—	6·0	0·6	2·8	—	—	—	6·	cold
Sulphurous.	Harrowgate [14]	103643	—	8·	19·	7·	—	18·5	5·5	—	—	—	0·5	—	615·5	3·	9·1	—	—	—	—	cold
	Moffat [14]	103643	—	1·	10·	4·	—	—	—	—	—	—	—	—	3·6	—	—	—	—	—	—	cold
	Aix la Chapelle [3]	8940	—	—	13·06	—	—	15·25	5·89	—	—	—	—	—	6·21	—	—	—	—	—	—	143°
	Enghein [5]	92160	—	18·5	70·	—	—	21·4	1·35	—	—	33·3	5·8	—	2·4	—	8·0	—	—	—	—	cold
Saline.	Sedlitz	58309	—	8·	—	—	—	6·7	21·	—	—	41·1	1444	—	—	—	36·5	—	—	—	—	cold
	Cheltenham [6]	103643	—	30·3	3·	12·	—	—	12·5	5·	48·0	40·	—	—	5·	—	12·5	—	—	—	—	cold
	Plombieres	—	—	—	—	—	4·4	1·	—	—	4·7	—	—	—	0·5	—	—	—	2·6	—	—	cold
Chalybeate.	Tunbridge [3]	103643	1·4	10·6	—	4·	—	—	—	1·	—	1·25	—	—	0·5	—	2·25	—	—	—	—	cold
	Brighton [4]	58309	—	18·	—	—	—	—	—	—	—	32·7	—	11·2	12·2	—	6·	—	1·12	—	—	cold
	Toplisz [7]	22540	—	—	—	—	13·5	16·5	—	32·5	—	—	—	—	61·3	28·5	—	—	—	15·1	—	cold
Calcareous, nearly pure.	Bath [8]	15360	—	2·4	—	—	—	1·6	—	·004	3·	18·	—	—	6·6	—	—	—	0.4	—	—	114°
	Buxton [9]	58309	—	—	—	2·	—	10·5	—	—	—	2·5	—	—	1·5	—	—	—	—	—	—	82°
	Bristol [11]	58309	—	30·3	—	—	—	13·5	—	—	11·2	11·7	—	—	4·	—	7·25	—	—	—	—	74°
	Matlock	58309	—	—	—	—	—	—	—	—	—	minute portion	—	—	—	—	—	—	—	—	—	66°
	Malvern	58309	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	cold

[1] Bergman. [2] Klaproth. [3] Babington. [4] Marcet. [5] Fourcroy. [6] Fothergill. [7] John.
[8] Phillips. [9] Pearson. [10] Schmesser.—*Phil. Trans.* lxxxii. 127. [11] Carrick. [14] Garnet,—*Sanders on Mineral Waters*, 514. 33.

Such are the known contents of the most celebrated mineral waters. Many more have been analysed, but it is unnecessary to introduce an account of them in this place; and I consider it to be of more importance to describe the method of determining the nature and proportion of the substances, or the analysis of mineral waters, one of the most difficult parts of practical chemistry.

METHOD OF ANALYSING MINERAL WATERS.[1]

THE first circumstance to be attended to in the chemical examination of any mineral water, is to determine the gross weight of the substances held in solution. This is to be done by first ascertaining the specific gravity of the mineral water; then subtracting from it the specific gravity of distilled water, (both expressed in whole numbers) multiplying the remainder by 1·4. The product is the gross saline contents, in a quantity of the water denoted by the number employed to indicate the specific gravity of distilled water.[2] Thus, if the specific gravity of the mineral water be 1·079, as that of distilled water is 1·000, the remainder, after the subtraction of the latter from the former, in whole numbers, will be 79, which multiplied by 14 makes 1106; and therefore 110·6 is the sum of the saline contents of 1000 parts of the water; or 11·06 are contained in 100 parts. The next step is to ascertain the particular substances, and the proportion of each, contained in the water.

1. The AERIAL or GASEOUS BODIES are to be first separated by boiling for a quarter of an hour, as much of the water as will fill two-thirds of a glass retort, connected with an inverted jar, divided into cubic inches and tenths, full of mercury, and placed in a mercurial trough. The air and gases will pass over into the jar, and depress the mercury; and when cool, after subtracting the air of the retort, the quantity of air expelled from the water may be easily determined.

The only gaseous bodies contained in water are atmospheric air, oxygen gas, azotic gas, carbonic acid gas, sulphureted hydrogen gas, and sulphurous acid: of which the following cannot exist together in the same water.

Oxygen gas and sulphureted hydrogen gas.
Sulphureted hydrogen gas and sulphurous acid.

If sulphureted hydrogen gas be present, it must be first separated; then the sulphurous acid, and carbonic acid gas; and lastly, the oxygen and azotic gases.

a. *Sulphureted hydrogen gas* is known to be contained in water by its peculiar odour, by the water becoming turbid when exposed to the air and depositing sulphur, by its reddening the infusing of litmus fugaciously, blackening paper dipped in a solution of lead, and precipitating nitrate of silver black or brown. It may be separated from the air obtained from water during boiling, by carrying the jar into a tub of warm water and introducing nitric acid, which absorbs the sulphureted hydrogen. The bulk of this gas contained in any water is determined by filling a jar three-fourths with the water, inverting it in a water-trough, and introducing nitrous gas at intervals, as long as red fumes appear, or the hepatic odour continues; when the jar is turned up and the air blown out. The nitrous gas in this operation mixing with the common air in the upper part of the jar forms nitrous acid, which renders the water turbid, by decomposing the sulphureted hydrogen and precipitating sulphur. The bulk of hepatic gas is determined by the weight of the sulphur thrown down, one grain indicating the presence of 3·33 cubic inches of the gas.

b. *Sulphurous acid gas* is ascertained by the same tests as discover the presence of sulphuric acid and water; (*which see.*)

c. *Carbonic acid gas* is detected by lime-water occasioning a precipitate soluble with effervescence in muriatic acid; by reddening fugaciously tincture of litmus, and losing this property when boiled.

To estimate the bulk of these gases, introduce into the air obtained by boiling the water, a solution of pure potash, and agitate the whole gently. These acid gases will be absorbed, and any other gases left; after which the bulk of the residuum must be estimated, and subtracted from the bulk of the whole to obtain that of the acid gases absorbed. Evaporate next the potash slowly, nearly to dryness; and by leaving it exposed to the atmosphere, sulphate of potash will be formed, which may be separated by dissolving the potash in diluted muriatic acid, and filtering the solution. 100 grains of sulphate of potash indicate 42·72 cubic inches of sulphureous acid gas, which being subtracted from the bulk of the gas absorbed by the potash, leaves the bulk of the carbonic acid gas.

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[1] The following observations on this important subject are chiefly extracted from the System of Chemistry of Dr. Thomson.

[2] This useful formula was invented by Mr. Kirwan. See *Essay on Mineral Waters*, 145.

d. *Oxygen gas,* after the above gases are separated, may be examined by means of the solution of sulphate of iron saturated with nitrous gas.[1] A small graduated tube filled with the air to be examined is to be plunged into this solution, and moved backwards and forwards for a few minutes. The whole of the oxygen is rapidly absorbed, and by marking the greatest absorption, its bulk in a given quantity of the air is ascertained.

e. *Azotic* or *nitrogen gas* is discovered by not being at all affected by eudiometrical processes.

2. ALKALIES, and ALKALINE, EARTHY, and METALLIC CABONATES. Alkalies, even in minute quantities, are discovered in water by rendering infusion of turmeric or paper stained with it brown.[2] When the change is permanent, the fixed alkalies may be supposed to be present; when fugacious, the alkali is ammonia. An infusion of Brazil-wood is rendered blue by the alkalies; but this also is the case with the alkaline and earthy carbonates[3], and the addition of sulphuric acid produces effervescence. Tincture of nutgalls discovers iron; the colour is violet if alkaline carbonates or earthy salts be also present; dark purple indicates other alkaline salts; purplish red, sulphureted hydrogen gas; and whitish and then black, sulphate of lime. Boiling the water precipitates the earthy and metallic carbonates.

The following substances of this class set down in the first column are incompatible, or cannot exist in mineral waters, with the salts placed in the opposite column.

Alkalies - - - - -	Fixed alkaline sulphates. Alum. Sulphate of magnesia. ——— of iron.
Alkaline carbonates - -	Muriate of barytes. ——— of lime. ——— of magnesia. Nitrate of lime.
Earthy carbonates - -	Sulphate of iron. Muriate of barytes.
Carbonate of magnesia -	Sulphate of lime. Alum. Muriate of lime.

a. *Alkalies and their carbonates* are ascertained to be present in mineral waters by the tests already mentioned; and by the water, after being boiled, throwing down a precipitate on the addition of muriate of magnesia. The volatile nature of ammonia easily distinguishes it if present, which is very seldom; and the best test for determining whether the fixed alkali be potash or soda is muriate of platina[1], which forms an immediate precipitate with potash or any salt containing it, but is not at all affected by soda. The quantity of an alkali is determined by saturating it with sulphuric acid, and noting the quantity of real acid[4] necessary; setting down, for every 100 grains of real acid used, 121·48 of potash, or 78·32 of soda; and the loss of weight produced by the effervescence on dropping in the acid, being added to the above, shows the quantity of an alkaline carbonate.

b. *Earthy carbonates.* If the water contains sulphureted hydrogen gas, this must be separated by exposing the water for a considerable time to the air, before the quantities of the earthy carbonates can be estimated. After thus exposing it, boil the water for fifteen minutes, filter it when cold; and treat what remains on the filter with muriatic acid, which will dissolve the carbonates of lime, of magnesia, and of iron. The residuum, which may contain carbonate of alumina, and perhaps sulphate of lime, is to be dried in a red heat, and its weight noted; and then boiled in a solution of carbonate of soda. The soda is next to be saturated with muriatic acid, and the mixture boiled for half an hour, which precipitates carbonate of lime and alumina. This precipitate being dried, the lime is to be separated by acetic acid, and the alumina that remains dried and weighed; so that by subtracting its weight from the original weight the proportion of sulphate of lime is ascertained.

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[1] Dr. Henry.

[2] This test is sufficiently delicate to detect soda when it amounts to $\frac{1}{2217}$th part only of the water.

[3] Sulphate of lime likewise produces the same effect.

[4] For a rule to determine the quantity of real acid in a diluted acid, see introduction.

To estimate the contents of the muriatic solution, add to it ammonia as long as it throws down a reddish precipitate, which is the iron united with a portion of magnesia. The magnesia is to be separated by acetic acid, the precipitate being previously dried by exposure to the air, in a heat of 200°, and the solution added to the muriatic solution; and to determine the weight of the iron, it is to be redissolved in muriatic acid, then precipitated by an alkaline carbonate, and dried and weighed.

Sulphuric acid is now to be added to the muriatic solution; and the sulphate of lime, thus obtained, is to be heated to redness, and weighed; setting down for every 100 grains of it 74 of carbonate of lime. From the solution the magnesia is lastly to be separated by subcarbonate of soda, dried and weighed; then evaporate the remaining solution to dryness, and wash the residue with distilled water so as to dissolve the muriate of soda. This residue is subcarbonate of magnesia, the weight of which, when dried, must be added to the former; which gives the entire weight of the subcarbonate of magnesia.

3. MINERAL ACIDS exist in mineral water sometimes uncombined, but more generally combined with alkalies and earths, forming sulphates.

a. SULPHURIC ACID is readily detected by muriate of barytes, when it does not exceed the millionth part of the water. To render this test certain, however, the muriate must be diluted; the alkaline carbonates, if the water contain any, must be previously saturated with muriatic acid; and the precipitate must be insoluble in muriatic acid. The hydro-sulphurets are precipitated by muriate of barytes, but their presence is easily detected by their odour.

The proportion of sulphuric acid is easily estimated by saturating it with barytes water, and heating the precipitate to ignition; every 100 grains of this sulphate of barytes indicate 34 of real sulphuric acid.

b. The *Sulphates* contained in mineral waters are six in number, and are incompatible with the following salts placed in the opposite column.

Fixed alkaline sulphates	Nitrates of lime and of magnesia. Muriates of lime and of magnesia.
Sulphate of lime - - -	Alkalies. Carbonate of magnesia. Muriate of barytes.
Alum - - - - -	Alkalies. Muriate of barytes. Nitrate, muriate, carbonate of lime. Carbonate of magnesia.
Sulphate of magnesia -	Alkalies. Muriate of barytes. Nitrate, muriate of lime.
Sulphate of iron - -	Alkalies. Muriate of barytes. Earthy carbonates.

b. 1. *Sulphate of soda*.—To detect this salt, first evaporate the water to one half, and add lime-water as long as any precipitate falls. This precipitates all the earths except sulphate of lime, which may be separated by evaporating the fluid till it becomes concentrated, then adding a little alcohol, and after filtration a little oxalic acid. If lime-water produces a precipitate in the water thus treated, immediately, or after a little alcohol be added, either sulphate of potash or of soda is present. To determine which, add acetate of barytes, which will precipitate sulphate of barytes; then filter and evaporate the filtered fluid to dryness, and dissolve the residue by digesting it in alcohol, and evaporate to dryness. If the sulphate be sulphate of potash, the dry salt thus obtained being acetate of potash, will deliquesce; but if it be sulphate of soda, the acetate will effloresce.

The proportion of the alkaline sulphates is found by precipitating their acid, by nitrate of barytes, from the water purified as above. If soda be the base of the salt contained in the water, for every 100 grains of this precipitate ignited, set down 61·2 grains of dried sulphate of soda; if potash be the base, for 100 grains of ignited precipitate set down 74·8 of dry sulphate of potash.

b. 2. *Sulphate of lime* is detected by an immediate precipitate being formed by oxalic acid, or oxalate of potash, which, although a less sensible, is, nevertheless, a more accurate test. To determine its quantity, first saturate any earthy carbonates that may be present with nitric acid; then evaporate the fluid to a few ounces; and having precipitated the sulphate of lime by means of proof spirit, dry and weigh it.

b. 3. *Alum* is detected by carbonate of magnesia, muriate of lime, muriate of magnesia, or succinate of ammonia. Twelve grains of alumina precipitated by carbonate of magnesia, heated to incandescence, indicate 100 grains of crystallized alum, or 49 of the dried salt.

b. 4. *Sulphate of magnesia* may be detected in any water (previously freed from any alum or uncombined acids it might have contained) by hydro-sulphuret of strontian, which produces an immediate precipitate with this salt, and with no other. If no other earthy sulphate be present, the sulphuric acid may be separated by a barytic salt; every 100 grains of the ignited precipitate indicating 51 grains of dried sulphate of magnesia. If sulphate of iron be present, mix the water with a portion of argil, and expose it for some days to the air, during which time oxyd of iron and sulphate of alumina are precipitated, leaving the sulphate of magnesia alone in solution; which may be then estimated by the above method.

b. 5. *Sulphate of iron* is detected by tincture of galls striking a black colour with the water after it has been boiled, and has cooled. Its quantity may be estimated by precipitating the iron by prussiate of potash.[1]

c. MURIATIC ACID, either uncombined or combined, in mineral waters is detected by nitrate of silver, which forms with it a white precipitate, insoluble in nitric acid; but the alkaline carbonates, if any, must be first saturated by nitric acid; and any sulphuric acid removed by nitrate of barytes. The proportion of uncombined muriatic acid is ascertained by saturating it with barytic water, and then precipitating the barytes by sulphuric acid. For every 100 grains of the ignited precipitate set down 21 grains of real muriatic acid.

d. The *Muriates* contained in mineral waters are incompatible with the following articles in the second column.

Muriate of barytes .	Sulphates. Alkaline carbonates. Earthy carbonates.
Muriate of lime . . .	Sulphates, except of lime. Alkaline carbonates. Carbonate of magnesia.
Muriate of magnesia .	Fixed alkaline sulphates. Alkaline carbonates.

d. 1. *Muriates of soda and of potash* are detected in water by acetate of silver: but any earthy nitrates and muriates must first be decomposed by sulphuric acid, and the sulphates separated by alcohol and nitrate of barytes. To ascertain whether the precipitate be muriate of soda or of potash, evaporate to dryness, then dissolve the acetate in alcohol, and again evaporate to dryness. If it be acetate of potash the salt will deliquesce, but if acetate of soda, it will effloresce. To estimate the quantity of these salts, if they be unaccompanied by other salts, it is only necessary to dry and weigh the precipitate by nitrate of silver; setting down for every 100 grains of muriate of silver thus thrown down, 52 of muriate of potash; and 41 of muriate of soda. If alkaline carbonates be present, they must be first saturated with sulphuric acid, and sulphate of silver used to precipitate the muriatic acid.

d. 2. *Muriate of Barytes* is detected by sulphuric acid. It is rarely found.

d. 3. *Muriate of Lime.* To detect this salt the water must be first freed from the sulphates, then filtered, evaporated to dryness, the dry mass treated with alcohol, and the residue, after evaporating the alcohol, dissolved in water. If this solution yields a precipitate with acetate of silver, the water contained muriate of lime.

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[1] To make the calculation, the weight of a precipitate produced by the prussiate in a solution of a given weight of sulphate of iron in water must be previously determined.

d. 4. *Muriate of magnesia* is detected by separating the sulphates, and proceeding as in the former case. If the aqueous solution of the dry mass treated with alcohol afford no precipitate with carbonate of lime; and if sulphuric acid and evaporation, with the addition of a little alcohol, occasion no precipitate, the solution contains only muriate of magnesia.

d. 5. *Muriate of alumina* is detected by first saturating any alkali the water may contain with nitric acid, and separating any sulphuric acid by nitrate of barytes; and then adding carbonate of lime, which produces a precipitate if this salt be present. This process also precipitates muriate of iron and of manganese, if any be present.

To estimate the quantities of these muriates, which may all be contained in the same water, the earths, after separating any sulphates that may be present, are to be precipitated by barytes water, and redissolved in muriatic acid. They are then to be separated by the rules already mentioned, and separately weighed. For every 50 grains of lime, set down 100 of dried muriate of lime; for 30 grains of magnesia, 100 of muriate of magnesia; and for 21·8 grains of alumina, 100 of muriate of alumina. The barytes of the muriate of barytes, which the addition of the barytes-water had formed in the mineral water by precipitating the earths, is now to be separated by sulphuric acid, and its muriatic acid expelled by heat; after which the muriate of soda which the water originally contained, is to be obtained by evaporation.

e. NITRIC ACID never exists in an uncombined state in mineral waters; and even the nitrates are comparatively of rare occurrence.

f. The *nitrates* are incompatible with the salts, in the second column of the following table.

Nitrate of lime . . .	Alkaline carbonates. Sulphates, except of lime. Carbonates of magnesia and alumina.
Nitrate of magnesia . . .	Fixed alkaline sulphates.

f. 1. *Nitrate of Potash* may occur in mineral waters in conjunction with sulphates and muriates; the former of which must be decomposed by acetate of barytes, and the latter by acetate of silver, before the nitrates can be estimated. After these previous steps, filter the water, then evaporate it to dryness, and treat the residue with alcohol; which dissolves the acetates, and leaves the nitre.

f. 2. *Nitrate of Lime* is detected by first concentrating the water, and separating the sulphates by alcohol; then filtering and distilling off the alcohol, and separating any muriatic acid by acetate of silver; afterwards, filtering again, evaporating to dryness, and dissolving the residue in alcohol, which must be also distilled off, and the dried residue dissolved in water. If oxalic acid detect lime in this solution, the mineral water contains nitrate of lime; the quantity of which may be estimated by precipitating with sulphuric acid, and calculating the quantity of lime contained in the sulphate; and for every 35 grains of lime setting down 100 grains of dry nitrate of lime.

f. 3. *Nitrate of Magnesia* is detected by nearly the same means; but to the last watery solution, instead of oxalic acid add potash, as long as any precipitate appears. Filter this solution; evaporate and treat the dry mass with alcohol. If a residue of nitre remains, the mineral water contained nitrate of magnesia.

Such is the general method of ascertaining the components of mineral waters, and the proportion of the ingredients contained in any particular water. To render the analysis complete, many minutiæ must necessarily be attended to; but the detail of these would far exceed the limits which a work of this kind can admit of; and, after all, much must depend upon the ingenuity and expertness of the operator.

No. II.

ON THE ART OF PRESCRIBING MEDICINES.

INDEPENDENT of the knowledge of diseases and the treatment of them, much of the success of the practitioner depends on circumstances connected altogether with the form in which the remedies are exhibited. In prescribing a medicine, even the best calculated to fulfil the object of the practitioner, it is necessary to consider the age, sex, temperament, habits, and idiosyncracy of the patient, before the dose can be properly apportioned; and, as far as the medicine itself is regarded, the most convenient and agreeable form of exhibiting it, whether it should be given alone, or combined with other ingredients; and how far these are likely to impede, modify, or facilitate its operation. An attention to these circumstances is absolutely requisite to prevent the errors which too frequently occur in forming a prescription.

1. *Circumstances connected with the state of the patient. Age.* Here it must be observed, that the doses of the medicines described in the foregoing pages, are those adapted for an adult; but, as in the two extremes of life, childhood and old age, the body is weaker, and in early youth more susceptible of all impressions, these quantities cannot be administered with safety in every case; and hence the judgment of the prescriber must be exercised. Under ordinary circumstances, the following table, originally drawn up by Gaubius, may be considered as a sufficient guide for the young practitioner.

Ages.	Proportional quantities.	Doses.
For an Adult,	Suppose the dose to be - - ONE	or 1 drachm.
Under 1 year	Will require only - - - - $\frac{1}{12}$	— 5 grains.
2 years	——— $\frac{1}{8}$	— 8 grains.
3 ——	——— $\frac{1}{6}$	— 10 grains.
4 ——	——— $\frac{1}{4}$	— 15 grains.
7 ——	——— $\frac{1}{3}$	— 1 scruple.
14 ——	——— $\frac{1}{2}$	— $\frac{1}{2}$ a drachm.
20 ——	——— $\frac{2}{3}$	— 2 scruples.
Above 21 ——	The full dose - - - - - -	— 1 drachm.
65 ——	The inverse gradation of the above.	———

Sex.—Although some women possess as much bodily strength and vigour of constitution as the majority of men; yet, the general greater delicacy and sensibility of the female frame, at every period of life, require not only caution in apportioning the doses of active medicines, which should be less than those ordered for men of the same age; but the medicines themselves should be such as are likely to fulfil the indications required, without much violence. The state of the uterine system likewise must not be overlooked in prescribing for a female. Thus the employment of aloetic and drastic purgatives, cinchona bark, sulphuric acid, and astringents, should be suspended during the period of the catamenia.

Temperament.—It is undoubtedly true, that persons of different temperaments or original conformations of body are differently affected by the operation of medicines. Stimulants more readily affect those of a sanguine temperament than those of a phlegmatic; and, therefore, smaller doses are required. In the phlegmatic, also, the bowels are generally torpid, and require both a description of purgatives and such doses of them to excite the proper peristaltic motion, as would induce either visceral inflammation, or be followed by an alarming state of debility, were they administered to those of a sanguine temperament. Hence the necessity of attending to this circumstance in prescribing.

Habits—have a considerable influence in modifying the operation of medicines. Persons addicted to the use of spirits, narcotics, and other stimulants, are less easily excited both by medicinal stimulants and narcotics; and the knowledge of the habits of a patient, as far as the exhibition of purgatives is concerned, is absolutely necessary for the prescriber, many people being in the almost daily habit of taking this class of remedies without consulting a medical practitioner. In the first of these cases, larger doses of stimulants and narcotics are required to produce the ordinary effects of these remedies; but in the second a change of the purgative usually taken will generally be sufficient. In the employment of medicines, also, which require to be long continued, the beneficial effect is soon lost if the doses be not increased.

Idiosyncracy. — Many persons have a peculiarity of disposition, unconnected with temperament, which renders them liable to be affected by substances, taken either in the form of food or of medicine, in a manner different from the majority of mankind. Such a state can be discovered only by accident or by time; but when it is known, it must be attended to by the practitioner. Instances in which opium proves deleterious in every form and dose, are not unfrequent: I knew a lady, in whom the smallest dose of squill excited an erythematic eruption over the whole body; and many examples of a similar kind might be quoted. But besides these guides in forming a prescription, the choice of the medicine must occasionally depend on the circumstance of the patient being more or less immediately under the eye of the prescriber. Thus, if the patient can be seen every day, or frequently, by the practitioner, the most active medicine which the nature of the case requires should be chosen; but if he cannot be frequently seen, or is not resident in the same place, the practitioner should choose a remedy of the same class, but less likely to have a sudden or violent effect. Thus in prescribing for ascites under such circumstances, squill or acetate of potash, or supertartrate of potash, must be preferred to elaterium; for intermittent fever, cinchona bark to the arsenical solution; and so in other cases.

2. *Of the Form and Composition of extemporaneous Prescriptions.* — In every prescription simplicity should be kept in view, and when one medicine will answer the intention of the prescriber, it ought to be preferred. The nauseous taste, however, and the other qualities of the great majority of drugs require the addition of others to modify their action: but, although medicines are more generally prescribed in a compound form, yet the practice of accumulating a great variety of ingredients in one prescription must be avoided.

Medicines exhibited in the fluid form operate sooner, and with more certainty, than in the solid state; but in choosing the vehicle or solvent, the taste of the patient ought not to be overlooked. Thus, for those to whom peppermint water is not disagreeable, the nauseous taste of sulphate of magnesia is more completely concealed by that vehicle than any other; if cinchona bark in powder be ordered, milk effectually covers its taste, provided the dose be taken the moment it is mixed; and if aloes, the most nauseous article of the materia medica, be prescribed in a fluid form, a solution of extract of liquorice renders it by no means unpalatable. Medicines which, when given alone, produce griping, require the addition of aromatics to correct that quality, and, when they operate with violence, mucilages and demulcents are sometimes necessary to obtund their acrimony, or narcotics to moderate their action. In prescribing purgatives, it is also necessary to consider the particular part of the alimentary canal on which they more immediately act. Thus rhubarb acts chiefly on the pylorus and duodenum, aloes on the rectum, and calomel and jalap on the larger intestines. Another reason for ordering medicines in a compound form is the necessity of producing two or more effects at one time. Thus the same dose may be required, in a case of colic for example, to allay pain and to open the bowels; or, in fever, to determine to the surface, to allay irritation, and produce sleep. But in combining medicines, care must be taken not to bring together incompatibles, or substances that decompose each other, or chemically combine, and consequently alter the nature of the mixture, or render it inert; unless the resulting compound be the remedy on which the practitioner relies. Thus acids and alkalies are incompatible, unless the neutral salt they produce be the remedy required; and astringent vegetable infusions and decoctions destroy the emetic and diaphoretic property of tartar emetic. Hence the necessity of a knowledge of chemistry to the medical practitioner.

In writing a prescription, the first object is the principal or most active ingredient, which is called the *basis;* the next the *adjuvans*, or that which is designed to promote the action of the basis; the third, the *corrigens*, or that intended to correct or modify its action; and the last the *vehiculum*, or that substance in which the more active ingredients are to be exhibited, and which consequently gives the formula its peculiar character. It has been usually regarded as a proper rule in writing a prescription to place the basis first, and the other articles in the form in which they have been enumerated; but this must depend on the mode best fitted for compounding the medicine. Thus salts and other soluble solids should be placed before the menstruum in which they are to be dissolved; and volatile substances should always be placed last, as they are necessarily the last ingredients added in the manipulation of the compound. Finally, the names of each ingredient should be written at full length, in a legible hand, and the symbols of the quantities distinctly marked, and no prescription should pass from the hand of the prescriber, without being deliberately read over, and its correctness ascertained.

Examples of the most usual Forms of extemporaneous Prescriptions.[1]

POWDERS.

NARCOTIC.

℞ *Pulveris conii* gr. ii.
——— *glycyrrhizæ radicis* gr. vi.
Sit pulvis ter quotidie sumendus.

In scirrhous affections, scrophula, painful old ulcers, &c.

℞ *Pulveris belladonnæ foliorum* gr. i.
——— *potassæ nitratis* gr. x.
——— *sacchari* gr. ix.
Fiat pulvis hora somni omni nocte sumendus.

In chronic rheumatism, extensive ulcerations, mania, and epilepsy.

ANTISPASMODIC.

℞ *Pulveris valerianæ radicis* ℈i.
——— *cinnamomi comp.* gr. x.
Fiat pulvis ter quaterve quotidie sumendus.

In hysteria, hemicrania, chlorosis.

℞ *Pulveris ipecacuanhæ radicis* gr. iii.
——— *sodæ subcarbonatis* gr. xii.
——— *opii* gr. i.
Fiat pulvis octava quaque hora sumendus.

Spasmodic asthma; hooping-cough.

TONIC.

℞ *Pulveris cinchonæ* ʒſs.
——— *cinnamomi comp.* gr. x.
Sit pulvis secundis horis in cyatho lactis, absente paroxysmo, sumendus.

In intermittents, after the stomach and bowels have been cleared.

℞ *Ferri tartarizati* gr. viii.
Pulveris calumbæ ℈i.
Fiat pulvis quarta quaque hora sumendus.

After diarrhœa; in scrophulous tumours and dyspepsia.

℞ *Pulveris simarubæ corticis* ℈i.
——— *opii* gr. ¼.
Pulvis tertia quaque hora sumendus.

In dysentery, after the bowels have been well cleared.

ASTRINGENT.

℞ *Pulveris catechu extracti* gr. xv.
——— *cretæ comp. cum opio* ℈i.
Sit pulvis post dejectiones singulas liquidas sumendus.

In diarrhœa, from a weakened state of the bowels.

℞ *pulveris kino compositi* gr. x.
Pulvis ex cyatho aquæ menthæ viridis sexta quaque hora sumatur.

In chronic diarrhœa and intestinal hæmorrhagies.

EMETIC.

℞ *Pulveris ipecacuanhæ* ℈i.
Antimonii tartarizati gr. i.
Fiat pulvis emeticus.

CATHARTIC.

℞ *Hydrargyri submuriatis* gr. iii.
Pulveris jalapæ,
Sacchari, sing. gr. x.
Sit pulvis vespere vel primo mane sumendus.

In bilious fevers, and slimy and obstructed bowels.

℞ *Hydrargyri submuriatis* gr. iii.
Pulveris scammoneæ compositi gr. xii.
Tere in pulverem, quamprimum sumendum.

In worm cases.

℞ *Potassæ supertartratis* gr. xv.
Cambogiæ,
Sacchari, singulorum gr. v.
Sit pulvis mane sumendus.

In ascites, and other dropsical cases.

℞ *Potassæ sulphatis* ʒi.
Pulveris rhei ℈iſs.
——— *florum anthemidum* ʒi.
Tere in pulverem, et divide in doses æquales sex, quarum sumat unam bis die in quovis vehiculo.

In dyspepsia, and a sluggish state of the bowels.

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[1] The doses are those proper for adults.

EMMENAGOGUE.

℞ *Pulveris foliorum sabinæ,*
——— *zingiberis,* āā gr. viii.
Sodæ boratis gr. xv.
Fiat pulvis bis die sumendus.

In amenorrhœa with a languid pulse.

DIURETIC.

℞ *Supertartratis potassæ* ʒi.
Pulveris scillæ siccatæ gr. ii.
——— *zingiberis* gr. iv.
Sit pulvis octava quaque hora sumendus.

In ascites.

DIAPHORETIC.

℞ *Pulveris antimonialis* gr. iii.
——— *tragacanthæ comp.* gr. x.
Sit pulvis quarta vel sexta quaque hora sumendus.

In the commencement of febrile diseases, after emptying the stomach and bowels.

℞ *Antimonii tartarizati* gr. ii.
Testarum præparatarum ℈ij.
Intime misceantur in pulverem, et divide in doses æquales decem, quarum sumat unam tertia quaque hora.

In puerperal fever, after bleeding, and the exhibition of a clyster.

℞ *Pulveris ipecacuanhæ* gr. ii.
——— *opii* gr. i. ss.
Potassæ nitratis gr. xvi. ss.
Fiat pulvis hora somni capiendus.

In acute rheumatism.

EXPECTORANT.

℞ *Pulveris ipecacuanhæ* gr. vi.
——— *potassæ nitratis* ℈iſs.
——— *myrrhæ* gr. xii.
Misce, et divide in doses æquales quatuor, quarum sumat unam quartis horis.

In asthma, and the earlier stage of phthisis pulmonalis.

REFRIGERANT.

℞ *Potassæ nitratis* gr. viii.
Pulveris tragacanthæ comp. ℈i.
Tere in pulverem, quartis horis in cyatho aquæ vel infusi lini sumendum.

In gonorrhœa.

PILLS.

NARCOTIC.

℞ *Opii* gr. i.
Fiat pilula hora somni sumenda.

To procure sleep in ordinary cases.

℞ *Pulveris digitalis* gr. iv.
Camphoræ gr. xii.
Extracti hyosciami gr. xviii.
Fiant pilulæ duodecim. Sumat tres omni nocte.

In maniacal and spasmodic affections.

SEDATIVE.

℞ *Plumbi superacetatis,*
Pulveris digitalis, āā gr. x.
——— *opii* gr. iii.
Mucilaginis acaciæ q. s.
Misce optime, et divide in pilulas æquales decem, quarum sumat unam sexta quaque hora.

In active hæmorrhagies. They have also been given in phthisis, one pill twice a day, after bleeding.

ANTISPASMODIC.

℞ *Opii* gr. ſs.
Castorei Rossici gr. vi. ſs.
Pulveris digitalis gr. i.
Syrupi q. s.
Fiant pilulæ duæ bis vel ter die repetendæ.

In spasmodic asthma and dyspnœa.

℞ *Cupriammoniati* gr. ii.
Micæ panis q. s.
Fiant pilulæ quatuor. Sumat unam bis quotidie.

In epilepsy, gradually increasing the dose.

STIMULANT.

℞ *Assafœtidæ gummi resinæ* ʒi.
Pulveris zingiberis ʒſs.
Ammoniæ subcarbonatis, āā ʒſs.
Syrupi q. s.
Ut fiant pilulæ triginta, quarum sumat tres tertiis horis.

In palsy.

TONIC.

℞ *Pulveris rhei,*
——— *zingiberis,* āā ʒſs.
Extracti anthemidis ʒi.
Fiat massa in pilulas æquales triginta dividenda, quarum capiat tres ante prandium quotidie.

In dyspepsia and chlorosis.

℞ *Ferri carbonatis,*
Extracti conii, āā ʒi.
Distribue in pilulas æquales viginti quatuor. Sumat duas bis die.

In fluor albus and scrophula.

ASTRINGENT.

℞ *Extracti cinchonæ* ʒii.
Aluminis ʒi.
Syrupi q. s.

Ut fiant pilulæ triginta sex. Sumat quatuor quarta vel sexta quaque hora.

In passive hæmorrhagies.

Cathartic.

℞ *Scammoneæ in pulv.* gr. iv.
Extracti taraxaci gr. xvi.

Fiant pilulæ sex, quarum sumat tres bis die.

In hypochondriasis and chronic hæpatitis.

℞ *Hydrargyri submuriatis* gr. iii.
Pulveris jalapæ gr. ix.
Mucilaginis acaciæ q. s.

Fiant pilulæ tres hora somni sumendæ.

To empty the bowels in bilious affections.

℞ *Pulveris aloes compositi* ʒi.
Pulveris jalapæ ℈ii.
Olei lavandulæ min. x.
Syrupi q. s.

Ut fiant pilulæ triginta. Sumat duas vel tres, adstricta alvo.

In habitual costiveness.

℞ *Pulveris rhei* ʒiſs.
Saponis gr. xv.
Aquæ q. s.

Ut fiant pilulæ viginti quatuor. Sumat tres vel quatuor pro re nata.

In costiveness arising from a deficiency of bile in the intestinal canal.

Emmenagogue.

℞ *Ferri sulphatis* ʒſs.
Potassæ subcarbonatis gr. x.
Myrrhæ ʒi.
Pulveris aloes compositi ʒſs.

Contunde simul, et divide massam in pilulas æquales triginta. Sumat tres bis quotidie.

In amenorrhœa with a languid pulse.

℞ *Pilulæ hydrargyri* ʒi.

Divide in pilulas æquales quindecim. Sumat unam omni mane et nocte.

In suppression of the menstrual discharge.

Diuretic.

℞ *Pulveris digitalis* gr. xii.
Hydrargyri submuriatis gr. iv.
Opii gr. iv.
Confectionis rosæ q. s.

Fiant pilulæ duodecim. Sumat unam octava quaque hora.

In hydrothorax, and ascites depending on some visceral obstruction.

℞ *Pilulæ hydrargyri* ʒi.
Pulveris scillæ ℈i.
Confectionis rosæ q. s.

Fiant pilulæ viginti. Sumat unam octava quaque hora.

In ascites and anasarca.

Diaphoretic.

℞ *Pulveris antimonialis* gr. v.
Opii,
Hydrargyri submuriatis āā gr. i.
Confectionis rosæ q. s.

Fiant pilulæ duæ hora somni sumendæ.

In acute rheumatism.

℞ *Antimonii tartarizati* gr. ii.
Opii gr. vi.
Camphoræ gr. xxxvi.
Spiritus rectificati min. iii.
Confectionis rosæ q. s.

Fiant pilulæ æquales duodecim, quarum sumat unam quarta quaque hora.

In fevers.

Expectorant.

℞ *Pulveris scillæ* gr. xxx.
Ammoniaci gum. res. ʒiſs.
Extract. conii gr. xxx.

Contunde simul, et divide massam in pilulas æquales triginta, quarum sumat duas sextis horis.

In asthma and chronic catarrh.

Sialogogue.

℞ *Pilulæ hydrargyri* ʒi.

Divide in pilulas æquales duodecim. Sumat unam mane nocteque.

In syphilis, herpetic eruptions, and chronic hepatitis.

℞ *Submuriatis hydrargyri* ℈i.
Opii gr. v.
Confectionis rosæ q. s.

Fiant pilulæ viginti. Sumat unam omni mane et nocte.

In syphilitic cases.

Lithontriptic.

℞ *Sodæ subcarbonatis exsiccatæ* ʒiſs.
Pulveris cinnamomi comp. ʒſs.
Saponis ʒſs.
Balsami Peruviani q. s.

Fiant pilulæ æquales triginta. Sumat tres ter quotidie.

In calculous affections.

Tonic and Purgative combined.

℞ *Ferri ammoniati* ʒi.
Extracti aloes,
——— *gentianæ,* āā ʒſs.

Contunde simul, et divide massam in pilulas triginta, quarum sumat duas ter quotidie.

In dyspepsia, hysteria, scrophula, and mesenteric obstructions.

Diaphoretic and Alterative.

℞ *Hydrargyri sulphureti rubri,*
Serpentariæ radicis in pulv. āā ʒi.
Syrupi aurantii q. s.

Misce, et divide in pilulas viginti quatuor, quarum sumat quatuor ter quotidie.

In herpetic and other obstinate cutaneous affections.

DRAUGHTS.

NARCOTIC.

℞ *Misturæ camphoræ* f℥iſs.
Tincturæ opii ♏xxxv.
Etheris sulphurici fʒi.
Syrupi croci fʒi.

Fiat haustus in promptu habendus, et urgente febris paroxysmo sumendus.

In intermittent head-ach.

℞ *Ammoniæ subcarbonatis* gr. xv.
Succi limonis recentis fʒiv.
Aquæ distillatæ f℥i.
Spiritus myristicæ fʒi.
Syrupi aurantii fʒſs.
Extracti conii gr. iv.

Fiat haustus ter die sumendus, addendo de die in diem extracti conii gr. i. *donec dosis ad* grs. vii. *pervenerit, in singulis haustibus.*

In diseases of increased irritability.

℞ *Potassæ subcarbonatis* ℈i.
Succi limonum recent. fʒiv.
Aquæ menthæ viridis f℥i.
Tincturæ opii min. xxv.
Syrupi tolutani fʒſs.

Fiat haustus, hora somni, vel vespertino, vel sera nocte, sumendus.

To procure sleep in the majority of diseases.

ANTISPASMODIC.

℞ *Misturæ moschi* fʒxiv.
Liquoris ammoniæ min. xvi.
Tincturæ castorei fʒi.
Syrupi papaveris fʒſs.

Fiat haustus, quarta quaque hora sumendus.

In hysteria, and convulsive affections, after the bowels have been effectually cleared.

℞ *Olei anisi* ♏x.
Magnesiæ ℈i.
Tincturæ sennæ fʒii.
Aquæ menthæ piperitæ fʒx.

Fiat haustus, urgente flatulentia sumendus.

In spasm of the stomach arising from flatulence.

TONIC.

℞ *Infusi cinchonæ cordifoliæ* f℥iſs.
Tincturæ cinchonæ comp. fʒi.
Pulveris cinchonæ cordifoliæ ℈ii.
Syrupi aurantii fʒſs.

Fiat haustus, secunda quaque hora sumendus.

In intermittents, and acute rheumatism after purging.

℞ *Infusi cascarillæ* f℥iſs.
Tincturæ cascarillæ,
——— *zingiberis,* āā fʒi.

Fiat haustus, bis quotidie sumendus.

In dyspepsia arising from intemperance.

℞ *Myrrhæ* gr. v.
Potassæ nitratis gr. iv.
Syrupi papaveris fʒſs.
Infusi calumbæ ſʒxvſs.

Fiat haustus, ter in die sumendus.

In humoral asthma, chronic catarrh, and phthisis pulmonalis unattended by much active inflammation.

ASTRINGENT.

℞ *Extracti hæmatoxyli* gr, xii.
Aquæ cinnamomi fʒxv.
Tincturæ catechu fʒi.

Fiat haustus, quarta quaque hora, vel post dejectiones singulas liquidas, sumendus.

In diarrhœas, and protracted dysentery.

EMETIC.

℞ *Pulveris ipecacuanhæ* ℈i.
Vini ipecacuanhæ fʒii.
Aquæ communis fʒvi.

Fiat haustus emeticus, quamprimum vel vespere sumendus.

For unloading the stomach in ordinary cases.

℞ *Zinci sulphatis* ℈i.
Aquæ distillatæ fʒx.

Fiat haustus, quamprimum sumendus.

In the commencement of the paroxysm of intermittent fever, or in cases of poisons having been taken into the stomach.

℞ *Cupri sulphatis* gr. x.
Aquæ distillatæ f℥ii.

Fiat haustus emeticus statim sumendus.

To excite immediate vomiting, when laudanum has been taken as a poison.

CATHARTIC.

℞ *Potassæ tartratis* ʒi.
Tincturæ sennæ fʒi.
Infusi sennæ fʒxivſs.
Syrupi croci fʒſs.

Fiat haustus, quamprimum vel primo mane sumendus.

In acute diseases.

℞ *Magnesiæ sulphatis* ʒii.
Infusi rosæ fʒxiv.
Acidi sulphurici diluti ♏x.
Mannæ ʒii.

Fiat haustus quartis horis sumendus.

In inflammatory affections.

℞ *Magnesiæ carbonatis* ʒi.
Pulveris rhei ℈i.
Aquæ menthæ piperitæ fʒxii.
Tincturæ cardamomi comp. fʒi.

Fiat haustus hora ante prandium sumendus.

In dyspepsia, attended with costiveness and acidity.

℞ *Olei ricini* fʒv.
Vitelli ovi q. s.
Aquæ rosæ fʒviii.
Tinct. lavandulæ comp. ♏viii.
Syrupi papaveris fʒi.
Fiat haustus statim sumendus.
In colic, and calculous affections.

Diuretic.

℞ *Tincturæ jalapæ* fʒiii.
Aceti scillæ fʒi.
Aquæ menthæ piperitæ fʒviii.
Fiat haustus ter in die sumendus.

℞ *Potassæ nitratis* gr. viii.
Tincturæ digitalis ♏xvi.
Infusi rosæ fʒxiii.
Syrupi rosæ fʒi.
Fiat haustus ter in die sumendus.
In dropsy.

Diaphoretic.

℞ *Potassæ subcarbonatis* ℈i.
Succi limonis recentis fʒiv.
Antimonii tartarizati gr. $\frac{1}{6}$.
Aquæ distillatæ fʒxi.
Syrupi papaveris fʒi.
Fiat haustus quarta vel sexta quaque hora sumendus.

℞ *Liquoris ammoniæ acetatis* fʒvi.
Misturæ camphoræ fʒx.
Vini ipecacuanhæ ♏xx.
Syrupi tolutani fʒſs.
Fiat haustus sextis horis sumendus.
In fevers, and inflammatory diseases.

Refrigerant.

℞ *Potassæ nitratis* gr. xii.
Misturæ amygdalæ f℥iſs.
Syrupi tolutani fʒi.
Fiat haustus quarta quaque hora sumendus.

℞ *Potassæ subcarbonatis* ℈i.
Syrupi fʒſs.
Spiritus myristicæ fʒſs.
Aquæ distillatæ f℥xi.
Fiat haustus in effervescentia cum succi limonis cochleari magno, secunda quaque hora sumendus.
In fevers, and inflammatory diseases.

Antacid.

℞ *Magnesiæ* ʒi.
Aquæ menthæ piperitæ f℥iſs.
Tincturæ aurantii fʒi.
Fiat haustus pro re nata sumendus.
In heartburn, and other cases of acidity of the stomach.

℞ *Liquoris ammoniæ* ♏xvi.
Misturæ amygdalæ f℥ ii.
Tincturæ opii ♏x.
Fiat haustus ter die sumendus.
In acidities of the primæ viæ.

Mixtures.

Tonic.

℞ *Infusi calumbæ* f℥vss.
Tincturæ cinnamomi comp. fʒii.
Syrupi aurantii fʒii.
Fiat mistura, cujus cochlearia duo majora quarta quaque hora sumantur.
In debilities of the digestive organs; and to check the severe vomiting which often occurs during pregnancy.

Astringent.

℞ *Catechu extracti* ʒii.
Aquæ cinnamomi f℥viii.
Tincturæ opii ♏lx.
Fiat mistura, cujus sumantur cochlearia tria magna post singulas dejectiones liquidas.
In the last stage of diarrhœa, or dysentery.

Emetic.

℞ *Antimonii tartarizati* gr. viii.
Aquæ distillatæ f℥vi.
Syrupi mori fʒi.
Fiat mistura, cujus cochlearia magna duo quamprimum, et octavis minutis donec evomuerit, sumenda.

℞ *Pulveris ipecacuanhæ* ʒſs.
Antimonii tartarizati gr. i.
Tincturæ scillæ fʒi.
Aquæ distillatæ f℥viiſs.
Fiat mistura emetica, cujus sumat quamprimum cochlearia majora quatuor, et cochlearia duo sexta quaque parte horæ donec supervenerit vomitus.
In dropsies before exhibiting the foxglove.

Cathartic.

℞ *Potassæ sulphatis* ʒii.
Aquæ fontanæ f℥vſs.
Tincturæ jalapæ fʒiv.
Sit mistura, cujus sumat cochlearia duo magna omni bihorio.

Expectorant.

℞ *Misturæ amygdalæ* f℥v.
Vini ipecacuanhæ,
Tincturæ scillæ, āā fʒi.
Syrupi tolutani fʒvi. *Misce.*
Sumat cochleare magnum urgente tussi.
In humoral asthma, and the latter stage of catarrh.

Demulcent.

℞ *Decocti althææ officinalis* f℥vi.
Syrupi f℥i.

Fiat mistura, cujus sumatur tertia pars sexta quaque hora.

In calculous cases, and inflammation of the kidneys.

Detergent Gargle.

℞ *Potassæ nitratis* ʒii.
Mellis rosæ f℥iv.
Infusi rosæ f℥vſs. *Misce.*

Fiat gargarysma sæpe utendum.

In inflammatory sore throat.

Astringent Gargle.

℞ *Infusi rosæ* f℥vii.
Tincturæ catechu fʒvi.
Acidi sulphurici diluti fʒi.
Tincturæ opii fʒiſs.

Sit gargarysma sæpe utendum.

In relaxations of the uvula.

EXTERNAL APPLICATIONS.

Lotions.

℞ *Ammoniæ muriatis* ʒi.
Aquæ fontanæ f℥v.
Spiritus rectificati f℥i.

Misce ut fiat lotio tumori applicanda.

In swelled testicle, and other inflammatory tumours.

℞ *Opii* ʒii.
Aceti distillati f℥vi.

Tere ut fiat lotio parti dolenti applicanda.

To painful affections of the joints, and in colic.

℞ *Zinci sulphatis,*
Plumbi superacetatis āā gr. x.
Aquæ rosæ,
—— *sambuci,* āā f℥iii.

Fiat colyrium subinde utendum.

In ophthalmia after local bleeding.

℞ *Plumbi superacetatis* gr. ix.
Aquæ rosæ f℥vſs.
Aceti distillati fʒiii.
Spiritus rectificati fʒi.

Misce ut fiat colyrium sæpe utendum.

In the acute stage of ophthalmia.

Embrocations.

Stimulant.

℞ *Linimenti ammoniæ fortioris* fʒvi.
Olivæ olei fʒii.

Fiat embrocatio, cum panno laneo, faucibus externis applicanda.

In cynanche tonsillaris.

Stimulant and Anodyne.

℞ *Linimenti camphoræ comp.* fʒix.
Tincturæ lyttæ fʒi.
—— *opii* fʒii.

Parti dolenti applicandum.

To be rubbed over the bowels in colic, cramp, and in painful affections of the joints.

Powders.

℞ *Pulveris gummi acaciæ* ℥ſs.
Aluminis gr. v.

Misce diligentissime ut fiat pulvis, cujus inspergatur pauxillum super mamillas pro re nata.

In sore nipples, to be applied after suckling.

℞ *Superacetatis plumbi* ʒi.
Pulveris cinchonæ ʒvii.

Tere, ut fiat pulvis, cujus pauxillum super ulceres omni mane spergatur.

For scrophulous ulcers.

Ointments.

℞ *Hydrargyri nitrico oxydi* ℈ii.
Adepis ℥i.

Tere diligenter in mortario, donec bene misceantur.

In ulcerations of the eyelids.

℞ *Zinci oxydi* ℈i.
Adepis ℥i.

Tere benissime in mortario, ut fiat unguentum.

In tinea capitis.

TABLE, showing the SYNONYMA of the Terms in the Pharmacopœias of London, Edinburgh, and Dublin, and the Doses of the Medicines.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Abietis resina			10 grs. to ½ dr.
		Abrotani folia	1 scr. to 1 dr.
Absinthium	Artemisiæ absinthii folia	Absinthii vulg. cacumina	1 scr. to 1 dr.
		——— maritimi cacumina	1 scr. to 1 dr.
Acaciæ gummi	Acaciæ Arabicæ gummi	Gummi Arabicum	½ dr. to 2 drs.
Acetosæ folia	Rumicis acetosæ folia		*ad libitum.*
Acetosella			*ad libitum.*
		Acetas ferri	10 minims to 30.
	Acetas hydrargyri	——— hydrargyri	1 gr. to 6 grs.
Acetum	Acetum	Acetum vini	1 fl. dr. to 4 fl. drs.
	——— aromaticum		
Acetum colchici			½ fl. dr. to 1½ fl. dr.
——— scillæ	Acetum scillæ maritimæ	——— scillæ	½ fl. dr. to 1½ fl. dr.
Acidum aceticum	Acidum aceticum tenue	——— distillatum	1 fl. dr. to 4 fl. drs.
	——— ——— forte	Acidum aceticum	½ fl. dr. to 1 fl. dr.
	——— ——— camphoratum	Aceticum camphoratum	½ fl. dr. to 1 fl. dr.
——— benzoicum	——— benzoicum	——— benzoicum	10 grs. to ½ dr.
——— citricum	——— citricum crystallizatum	——— citricum crystallis concretum	10 grs. to 2 drs.
——— muriaticum	——— muriaticum	——— muriaticum	10 mins. to 20 mins.
		——— ——— dilutum	15 mins. to 1 fl. dr.
——— nitricum	——— nitricum		6 mins. to 20 mins.
——— ——— dilutum			10 mins. to 30 mins.
	——— nitrosum	——— nitrosum	6 mins. to 20 mins.
	——— ——— dilutum	——— ——— dilutum	10 mins. to 30 mins.
	——— succinicum	——— succini	5 grs. to 1 scr.
——— sulphuricum	——— sulphuricum	——— sulphuricum	
——— sulphuricum dilutum	——— ——— dilutum	——— ——— dilutum	10 mins. to 40 mins.
	——— ——— aromaticum		10 mins. to 40 mins.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Aconiti folia.	Aconiti napelli folia	Aconiti folia	1 gr. to 5 grs.
Adeps	Adeps suillus et ovillus	Adeps suillus	
—— præparata		—— præparata	
Ærugo	Subacetas cupri	Ærugo	⅛ gr. to 1 gr.
		—— præparata	⅛ gr. to 1 gr.
		Æsculi hippocastani, sem. cortex	½ dr. to 1 dr.
Æther sulphuricus		Æther sulphuricus	
—— rectificatus	Æther sulphuricus		½ fl. dr. to 2 fl. dr.
		—— nitrosus	
	—— sulph. cum alcohole		½ fl. dr. to 2 fl. dr.
		Agrimonia	½ dr. to 1 dr.
Alcohol	Alcohol fortius	Alcohol	½ fl. dr. to 1 dr.
Allii radix	Allii sativæ radix	Allii sativi radix	1 dr. to 2 dr.
Alöes spicatæ extractum	Alöes socotorina	Alöes socotorina	5 grs. to 15 grs.
3 —— vulgaris extractum	—— hepatica	—— hepatica	5 grs. to 15 grs.
D Althææ folia et radix.	Althææ officinalis radix		*ad libitum.*
3 Alumen	Alumen	Alumen	10 grs. to 1 scr.
—— exsiccatum	—— exsiccatum	—— ustum	
Ammoniæ subcarbonas	Subcarbonas ammoniæ	Carbonas ammoniæ	5 grs. to 1 scr.
—— murias	Murias ammoniæ	Sal ammoniacum	10 grs. to ½ dr.
Ammoniacum	Ammoniacum	Ammoniacum	10 grs. to ½ dr.
Amygdalæ amaræ, dulces	Amygdalæ communis nuclei	Amygdala dulcis	
Amylum	Amylum	Tritici farina	
	Amyridis gileadensis resina		1 scr. to 1 dr.
	Anchusæ tinctoriæ radix	Anchusæ radix	
Anethi semina			10 grs. to 1 scr.
	Angelicæ archangelicæ radix		½ dr. to 3 drs.
Anisi semina	Pimpinellæ anisi semina	Anisi semen	10 grs. to 1 scr.
Anthemidis flores	Anthemidis nobilis flores	Chamœmeli flores	10 grs. to 1 scr.
Antimonii oxydum		Oxidum antimonii nitro-muriaticum	1 gr. to 10 grs.
—— sulphuretum	Sulphuretum antimonii		10 to grs. ½ dr.
—— sulphuretum præcipitatum	—— —— antim. præcipitatum	Sulphuretum antimonii præcipitatum	1 gr. to 5 grs.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Antimonium tartarizatum	Tartras antimonii	Tartarum antimoniatum	$\frac{1}{4}$ gr. to $\frac{1}{2}$ gr. *diaph.* $\frac{1}{2}$ gr. to 3 grs. *emet.*
		Aqua alcalina oxymuriatica	1 fl. dr. to 2 fl. drs.
Aqua anethi			2 fl. oz. to 6 fl. oz.
		—— calcis composita	
—— carui			
—— cinnamomi	Aqua lauri cinnamomi	—— cinnamomi	
	—— citri aurantii		
	—— citri medicæ		
—— distillata	—— distillata	—— distillata	
—— fœniculi		—— fœniculi	2 fl. oz. to 6 fl. oz.
	—— lauri cassiæ		
—— menthæ piperitæ	—— menthæ piperitæ	—— menthæ piperitis	
—— menthæ viridis			
—— pimentæ	—— myrti pimentæ		
—— pulegii	—— pulegii	—— pulegii	
—— rosæ	—— rosæ centifoliæ	—— rosæ	
		—— oxymuriatica	1 fl. dr. to 2 fl. dr.
		—— picis liquidæ	1 pint to 2 pints.
		—— sulphureti ammoniæ	5 mins. to 10 mins.
		—— sulphureti kali	20 mins. to 1 dr.
	—— supercarbonatis potassæ		8 fl. oz.
	—————— sodæ		8 fl. oz.
		Ari radix recens	6 grs. to 1 scr.
	Arctii lappæ radix	Bardanæ radix	
Argenti nitras	Argenti nitras	Argenti nitras	$\frac{1}{2}$ gr. to 5 grs.
Armoraciæ radix	Cochleariæ armoraciæ radix	Raphani rusticani radix	1 scr. to 1 dr.
	Arnicæ montanæ herba	Arnicæ herba	5 grs. to 10 grs.
Arsenici oxydum	Arsenici oxidum		$\frac{1}{10}$ gr. to $\frac{1}{4}$ gr.
——— oxydum sublimatum			$\frac{1}{10}$ gr. to $\frac{1}{4}$ gr.
		Arsenias kali	$\frac{1}{10}$ gr. to $\frac{1}{2}$ gr.
	Artemisiæ santonicæ cacumina	Santonici cacumina	$\frac{1}{2}$ dr. to 1 dr.
Asari folia	Asari europææ folia	Asari folia	10 grs. to 1 scr.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Assafœtidæ gummi resina	Ferulæ assafœtidæ gummi resina	Assafœtida gummi resina	10 grs. to ½ dr.
Aurantii baccæ, cortex	Citri aurantii cortex, succus	Citra aurantii cortex exterior	1 scr. to 2 drs.
Avenæ semina	Semina avenæ sativæ; farina		
Balsamum peruvianum	Myroxyli peruiferi balsamum	Balsamum peruvianum	10 grs. to ½ dr.
——— tolutanum	Toluiferæ balsami balsamum	——— tolutanum	10 grs. to ½ dr.
		Beccabungæ herba	1 dr. to 2 drs.
Belladonnæ folia	Atropæ belladonnæ folia	Belladonnæ folia	½ gr. to 5 grs.
Benzoinum	Styracis benzoini balsamum	Benzoe	10 grs. to ½ dr.
Bistortæ radix	Polygoni bistortæ radix	Bistorta	10 grs. to 1 dr.
	Boletus ignarius		
Cajuputi oleum	Melaleucæ leucadendri oleum volatile	Oleum cajuput	1 min. to 5 mins.
Calami radix	Acori calami radix	Acori radix	10 grs. to 1 dr.
Calamina	Carbonas zinci impurus	Calaminaris	10 grs. to 1 dr.
——— præparata	——— præparatus	Lapis calaminaris præparatus	10 grs. to 1 dr.
Calumbæ radix	Colombæ radix	Colombo	10 grs. to 1 scr.
Calcis murias	Calx	Calx	
Cambogia	Gambogia	Gambogia	2 grs. to 12 grs.
Camphora	Camphora	Camphora	3 grs. to 1 scr.
Canellæ cortex	Canellæ albæ cortex	Canellæ albæ cortex	10 grs. to 1 dr.
Capsici baccæ	Capsici annui fructus	Capsici baccæ	5 grs. to 10 grs.
Carbo ligni	Carbo ligni	Carbo ligni	10 grs. to 1 scr.
	Carbonas barytæ		
	Carbonas potassæ		5 grs. to ½ dr.
Cardamines flores	Cardamines pratensis flores	Cardamines flores	1 scr. to 1 dr.
Cardamomi semina	Amomi repentis semina	Cardamomi minoris semina	5 grs. to ½ dr.
Caricæ fructus	Fici caricæ fructus	Caricæ fructus	
Carui semina	Cari carui semina	Carum	10 grs. to 1 dr.
Caryophylli	Eugeniæ caryophyllatæ flores	Caryophyllus aromaticus	10 grs. to ½ dr.
——— oleum	——— oleum	——— oleum	2 mins. to 5 mins.
Cascarillæ cortex	Crotonis eleutheriæ cortex	Cascarillæ cortex	10 grs. to 1 dr.
Cassiæ pulpa	Cassiæ fistulæ fructus	Cassia fistularis	½ oz. to 1 oz.
Castoreum	Castoreum	Castoreum rossicum & canadense	5 grs. to 1 scr.
Cataplasma fermenti			

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Cataplasma sinapis		Cataplasma sinapeas	
Catechu extractum	Catechu extractum	Catechu	10 grs. to 2 scr.
	Centauriæ benedictæ herba	Cardui benedictæ folia	10 grs. to 1 scr.
Centaurii cacumina	Chironiæ centaurii sum. florens	Centaurium minus	15 grs. to 1 dr.
Cera flava et alba	Cera flava et alba	Cera flava et alba	
Cerevisiæ fermentum	Cerevisiæ fermentum		
Ceratum			
——— calaminæ	Ceratum carbonatis zinci impuri	Unguentum calaminaris	
——— cetacei	——— simplex		
——— lyttæ			
——— plumbi superacetatis	Unguentum acetatis plumbi	Unguentum acetatis plumbi	
——— plumbi compositum			
——— resinæ			
——— sabinæ	Ceratum juniperi sabinæ	Unguentum sabinæ	
——— saponis			
		Chamædryos herba	10 grs. to ½ dr.
Cetaceum	Spermaceti	Spermaceti	1 scr. to 1½ dr.
Cinchonæ cordifoliæ cortex	Cinchonæ cordifoliæ cortex	Cinchona	10 grs. to 1½ dr.
——— lancifoliæ cortex	——— lancifoliæ cortex		10 grs. to 1½ dr.
——— oblongifoliæ cortex	——— oblongifoliæ cortex		10 grs. to 1½ dr.
Cinnamomi cortex	Lauri cinnamomi cortex	Cinnamomi cortex	5 grs. to 1 scr.
——— oleum	——— oleum	——— oleum	1 min. to 3 mins.
Coccus	Coccus cacti	Coccinella	5 grs. to 1 scr.
Cocculis Indicus	Menispermi cocculi baccæ		
	Cocci butyraceæ nucis oleum fixum		
Colchici radix	Colchici autumnalis radix	Colchici radix	1 gr. to 5 grs.
Colocynthidis pulpa	Cucumeris colocynthidis fructus	Colocynthidis fructus medulla	1 gr. to 5 grs.
Confectio amygdalarum			1 dr. to 1 oz.
——— aromatica	Electuarium aromaticum	Electuarium aromaticum	10 grs. to 1 dr.
——— aurantiorum	Conserva citri aurantii	Conserva aurantii	1 dr. to 1 oz.
——— cassiæ	Electuarium cassiæ fistulæ	Electuarium cassiæ	1 dr. to 1 oz.
——— opii	——— opiatum		10 grs. to ½ dr.
——— rosæ caninæ	Conserva rosæ caninæ		1 dr. to 1 oz.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Confectio rosæ gallicæ	Conserva rosæ gallicæ	Conserva rosæ	1 dr. to 1 oz.
—— rutæ			
—— scammonii		Electuarium scammonii	1 scr. to 1 dr.
—— sennæ	Electuarium compositum sennæ	—— sennæ	½ dr. to 4 dr.
Conii folia	Conii maculati folium et semen	Cicuta	2 grs. to 1 scr.
Contrayervæ radix	Dorsteniæ contrayervæ radix		10 grs. to ½ dr.
Copaiba	Copaiferæ officinalis resina liquida	Balsamum copaibæ	1 scr. to 1 dr.
Coriandri semina	Coriandri sativi semina	Coriandrum	1 scr. to 1 dr.
Cornua	Cervi elaphi cornu	Cornu cervinum	
Cornu ustum			½ dr. to 2 drs.
Creta	Carbonas calcis	Creta	½ dr. to 2 drs.
		—— præcipitata	½ dr. to 2 drs.
—— præparata	—— præparatus	—— præparata	½ dr. to 2 drs.
Croci stigmata	Croci sativi stigma	Crocus	10 grs. to 1 dr.
Cumini semina			1 scr. to 1 dr.
Cuprum ammoniatum	Ammoniaretum cupri	Cuprum ammoniatum	½ gr. to 5 grs.
Cupri sulphas	Cupri sulphas	Cupri sulphas	1 gr. to 5 grs.
Cuspariæ cortex	Bonplandiæ trifoliatæ cortex	Angustura	10 grs. to 1 dr.
Cydoniæ semina			
			1 gr. to 5 grs.
Dauci radix	Dauci caroti semina	Dauci sylvestris semina	1 scr. to 1 dr.
	Decoctum althææ officinalis		2 fl. oz. to 4 fl. oz.
Decoctum alöes compositum	—— anthemidis nobilis	Decoctum chamœmeli comp.	½ fl. oz. to 2 fl. oz.
—— cinchonæ	—— cinchonæ lancifoliæ	—— corticis cinchonæ	1 fl. oz. to 4 fl. oz.
—— cydoniæ			1 fl. oz. to 4 fl. oz.
	—— daphnes mezerei		1 pint, *daily*.
		—— digitalis	½ fl. oz. to 1 fl. oz.
—— dulcamaræ			½ fl. oz. to 2 fl. oz.
	—— Geoffrææ inermis		1 fl. oz. to 1½ fl. oz.
	—— guaiaci compositum		3 fl. oz. to 6 fl. oz.
—— hordei	—— hordei distichi	—— hordei	4 fl. oz. to ½ pint.
—— hordei compositum		—— hordei compositum	4 fl. oz. to ½ pint.
—— lichenis	—— lichenis islandici	—— lichenis islandici	1 fl. oz. to 4 fl. oz.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Decoctum malvæ compositum			2 fl. oz. to 4 fl. oz.
——— papaveris			
——— quercus			1 fl. oz. to 2 fl. oz.
——— sarsaparillæ	Decoctum smilacis sarsaparillæ	Decoctum sarsaparillæ	4 fl. oz. to ½ pint.
——— ——— compositum		——— ——— compositum	4 fl. oz. to ½ pint.
——— senegæ	——— polygalæ senegæ		½ fl. oz. to 2 fl. oz.
——— ulmi	——— ulmi campestris	——— ulmi	4 fl. oz. to ½ pint.
——— veratri			
	Dianthi caryophylli flos		
Digitalis folia	Digitalis purpureæ folia	Digitalis folia	½ gr. to 3 grs.
Dolichi pubes	Dolichi prurientis pubes	Dolichi, setæ leguminum	5 grs. to 10 grs.
Dulcamaræ caulis		Dulcamaræ stipites, autumno collecti	1 scr. to 1 dr.
Elaterii poma	Elaterium	Elaterii fructus	2 grs. to 3 grs.
	Electuarium catechu	Electuarium catechu compositum	1 scr. to 1 dr.
Elemi		Elemi resina	10 grs. to ½ dr.
Emplastrum ammoniaci			
——— ammoniaci cum hydrargyro		Emplastrum ammoniaci cum hydrargyro	
	Emplastrum assafœtidæ		
		——— calefaciens	
——— ceræ	——— simplex		
——— cumini			
——— galbani compositum	——— gummosum	——— galbani	
——— hydrargyri			
——— lyttæ	——— cantharidis vesicatoriæ	——— cantharidis	
	——— compositum		
	——— oxidi ferri rubri		
——— opii			
——— picis compositum			
——— plumbi	——— oxidi plumbi semivitrei	——— lithargyri	
——— resinæ	——— resinosum	——— lithargyri cum resina	
——— saponis	——— saponaceum	——— saponis	

London.	*Edinburgh.*	*Dublin.*	*Doses.*
		Emplastrum thuris	
	Emulsio acaciæ Arabicæ		1 fl. to oz. to 4 fl. oz.
		——— arabica	1 fl. oz. to 4 fl. oz.
	——— camphoræ		1 fl. oz. to 2 fl. oz.
		Enulæ campanæ radix	1 scr. to 1 dr.
		Eryngii radix	1 dr. to 2 drs.
Euphorbiæ gummi resina			
		Extractum cacuminum absinthii	10 grs. to 1 scr.
Extractum aconiti			1 gr. to 5 grs.
——— alöes			5 grs. to 15 grs.
——— anthemidis	Extractum anthemidis nobilis	——— florum chamœmeli	10 grs. to 1 dr.
——— belladonnæ	Succus spissatus atropæ belladonnæ		1 gr. to 5 grs.
		——— cascarillæ resinosum	10 grs to 1 scr.
——— cinchonæ	Extractum cinchonæ lancifoliæ	——— cinchonæ	10 grs. to $\frac{1}{2}$ dr.
——— cinchonæ resinosum		——— cinchonæ rubræ resinosum	10 grs. to $\frac{1}{2}$ dr.
——— colocynthidis			5 grs. to $\frac{1}{2}$ dr.
——— colocynthidis compositum		——— colocynthidis comp.	5 grs. to $\frac{1}{2}$ dr.
——— conii	Succus spissatus conii maculati	Succus spissatus cicutæ	5 grs. to 1 scr.
——— elaterii		Elaterium	$\frac{1}{2}$ gr. to 3 grs.
		Extractum cacuminum genistæ	10 grs. to 1 dr.
——— gentianæ	Extractum gentianæ luteæ	——— radicis gentianæ	10 grs. to $\frac{1}{2}$ dr.
——— glycyrrhizæ		——— glycyrrhizæ	1 dr. to 4 drs.
——— hæmatoxyli	——— hæmatoxyli campechiani	——— scobis hæmatoxyli	10 grs. to $\frac{1}{2}$ dr.
	——— hellebori nigri	——— hellebori nigri	3 grs. to 1 scr.
——— humuli			5 grs. to 1 scr.
——— hyosciami	Succus spissatus hyosciami nigri	Succus spissatus hyosciami	5 grs. to 1 scr.
——— jalapæ	Extractum convolvuli jalapæ	——— radicis jalapæ	10 grs. to 1 scr.
		——— jalapæ resinosum	10 grs. to 1 scr.
——— opii			$\frac{1}{2}$ gr. to 5 grs.
——— papaveris	——— papaveris somniferi		2 grs. to 1 scr.
		——— corticis quercus	10 grs. to $\frac{1}{4}$ dr.
——— rhei			10 grs. to $\frac{1}{2}$ dr.
——— sarsæparillæ		——— valerianæ	10 grs. to $\frac{1}{2}$ dr.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Extractum taraxaci			
Farina	Farina tritici hyberni	Farina tritici æstivi	
Ferrum	Ferrum	Ferrum	10 grs. to $\frac{1}{2}$ dr.
——— ammoniatum	Murias ammoniæ et ferri	Murias ammoniæ et ferri	3 grs. to 15 grs.
Ferri subcarbonas	Carbonas ferri præcipitatus	Carbonas ferri	2 grs. to 10 grs.
—— sulphas	Sulphas ferri	Sulphas ferri	1 gr. to 5 grs.
		Rubigo ferri	2 grs. to 10 grs.
Ferrum tartarizatum		Tartarum ferri	5 grs. to 1 dr.
Filicis radix	Aspidii filicis maris radix	Filicis maris radix	1 dr. to 4 drs.
Fœniculi semina	Anethi fœniculi semina	Fœniculi dulcis semina	1 scr. to 1 dr.
Fucus		Quercus marina	
Galbani gummi resina	Bubonis galbani gummi resina	Galbani gummi resina	10 grs. to $\frac{1}{2}$ dr.
Gallæ	Galla	Gallæ	2 grs. to 10 grs.
Gentianæ radix	Gentianæ luteæ radix	Gentianæ radix	10 grs. to 1 dr.
	Geoffrœæ inermis cortex	Geoffrœæ cortex	1 scr. to 2 scrs.
		Geum urbanum; radix	1 dr. to 2 drs.
Glycyrrhizæ radix	Glycyrrhizæ glabræ radix, extractum.	Glycyrrhizæ radix	$\frac{1}{2}$ dr. to 1 dr.
Granati cortex	Punicæ granati, cortex, flos plenus, vulgo Balaustium	Granatum, flores, pericarpii cortex	1 scr. to 1 dr.
	Gratiola officinalis; herba	Gratiola; herba	10 grs. to 1 scr.
Guaiaci resina et lignum	Guaiaci officinalis lignum	Guaiaci resina et lignum	10 grs. to $\frac{1}{2}$ dr.
Hæmatoxyli lignum	Hæmatoxyli campechiani lignum	Hæmatoxyli lignum	1 scr. to 1 dr.
Hellebori fœtidi folia		Helleboraster; folia	10 grs. to $\frac{1}{2}$ dr.
——— nigri radix	Hellebori nigri radix	Helleborus niger; radix	10 grs. to $\frac{1}{2}$ dr.
Hordei semina	Hordei distichi semen	Hordei semina	
Humuli strobili	Humuli lupuli strobili		10 grs. to $\frac{1}{2}$ dr.
Hydrargyrum	Hydrargyrus	Hydrargyrum	2 oz. to 4 oz.
Hydrargyrum purificatum	——— purificatus	——— purificatum	2 oz. to 4 oz.
Hydrargyri nitrico-oxydum		Oxydum hydrargyri nitricum	$\frac{1}{2}$ gr. to 2 grs.
——— oxydum cinereum	Oxidum hydrargyri cinereum	Pulvis hydrargyri cinereus	2 grs. to 10 grs.
——— oxydum rubrum		Oxydum hydrargyri	$\frac{1}{2}$ gr. to 2 grs.
——— oxymurias	Murias hydrargyri corrosivus	Murias hydrargyri corrosivum	$\frac{1}{8}$ gr. to $\frac{1}{2}$ gr.
——— submurias	Submurias hydrargyri mitis	Submurias hydrargyri sublimatum	1 gr. to 15 grs.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Hydrargyri sulphuretum rubrum	Sulphuretum hydrargyri	Hydrargyri sulphuretum rubrum	10 grs. to ½ dr.
———— nigrum	———— hydrargyri nigrum		
Hydrargyrum cum creta		Hydrargyrum cum creta	10 grs. to ½ dr.
		———— cum magnesia	10 grs. to ½ dr.
———— præcipitatum album		Submurias hydrargyri ammoniatum	5 grs. to 10 grs.
	Hydrosulphuretum ammoniæ		5 grs. to 12 grs.
Hyosciami folia et semina	Hyosciamus nigra herba	Hyosciamus ; herba	5 grs. to 15 grs.
	Hyssopi officinalis herba	Hyssopus folia	1 scr. to 1 dr.
		Ichthyocolla	
Infusum anthemidis	Infusum anthemidis nobilis		1 fl. oz. to 4 fl. oz.
——— armoraciæ compositum			
——— aurantii compositum			
——— calumbæ	——— colombæ		
——— caryophyllorum			
——— cascarillæ			
——— catechu compositum	——— acaciæ catechu		
——— cinchonæ	——— cinchonæ lancifolia	Infusum cinchonæ sine calore	
——— cuspariæ			
——— digitalis	——— digitalis purpureæ		4 fl. drs. to 2 fl. oz.
——— gentianæ compositum	——— gentianæ compositum	——— gentianæ compositum	1 fl. oz. to 4 fl. oz.
——— lini	——— lini usitatissimi		1 fl. oz. to ½ pint
		——— menthæ compositum	1 fl. oz. to 4 fl. oz.
——— quassiæ	——— quassiæ excelsæ		2 fl. oz. to 4 fl. oz.
——— rhei	——— rhei		
——— rosæ	——— rosæ gallicæ	——— rosæ	
——— sennæ	——— cassiæ sennæ	——— sennæ	
——— simarubæ			
——— tabaci			
	——— sennæ compositum	——— sennæ cum tamarindis	2 fl. oz. to 4 fl. oz.
		——— valerianæ	
Ipecacuanhæ radix	Ipecacuanhæ radix	Ipecacuanhæ radix.	½ gr. to 2 grs. *diaph.* 5 grs. to ½ dr. *emet.*
	Iridis florentinæ radix		

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Jalapæ radix	Convolvuli jalapæ radix	Jalapæ radix	10 grs. to ½ dr.
Juniperi baccæ et cacumina	Juniperi communis baccæ	Juniperus ; bacca	½ dr. to 1 dr.
Kino	Kino	Kino	10 grs. to ½ dr.
	Lactucæ virosæ folium		3 grs. to 15 grs.
	Lactucarium		
Lapis calcareus	Lauri cassiæ cortex, flores	Cassia lignea ; cortex ; flores nondum expliciti	5 grs. to 1 scr.
Lavandulæ flores	Lavandulæ spicæ flores	Lavandulæ flores	1 scr. to 1 dr.
Lauri baccæ et folia	Lauri nobilis baccæ		1 grs. to ½ dr.
Lichen	Lichen islandicus	Lichen islandicus	1 scr. to 1 dr.
Limones	Citri medicæ fructus, &c.	Limon ; fructus succus, &c.	
Limonum cortex		——— epidermis	1 scr. to 1 dr.
——— oleum			
Linimentum æruginis		Oxymel æruginis	
——— ammoniæ fortius	Oleum ammoniatum	Linimentum ammoniæ	
	Linimentum aquæ calcis	——— calcis	
——— ammoniæ subcarbonatis			
——— camphoræ	Oleum camphoratum	Oleum camphoratum	
——— camphoræ comp.			
——— hydrargyri			
——— saponis compositum	Linimentum saponaceum		
——— terebinthinæ			
Linum catharticum		Linum catharticum	½ dr. to 1 dr.
Lini usitatissimi semina	Lini usitatissimi semina	——— ; semina	
Liquor aluminis compositus			
——— ammoniæ	Aqua ammoniæ	Aqua ammoniæ causticæ	10 mins. to 20 mins.
——— acetatis	——— acetatis	Liquor ammoniæ acetatis	2 fl. drs. to 6 fl. drs.
——— subcarbonatis		Aqua ammoniæ carbonatis	½ fl. dr. to 1½ fl. dr.
——— antimonii tartarizati	Vinum tartratis antimonii		15 mins. to 1½ dr. *sud.* 3 fl. drs. to 1 fl. oz. *emet.*
——— arsenicalis			5 mins. to 15 mins.
——— calcis	Aqua calcis	Aqua calcis	2 fl. oz. to ½ pint.
——— muriatis			

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Liquor cupri ammoniati		Aqua cupri ammoniati	3 mins. to 15 mins.
——— ferri alkalini			½ fl. dr. to 1 fl. dr.
——— hydrargyri oxymuriatis			1 fl. dr. to 4 fl. drs.
——— plumbi subacetatis		Liquor subacetatis lithargyri	
——————— dilutus		——————— comp.	
——— potassæ	Aqua potassæ	Aqua kali caustici	10 mins. to ½ fl. dr.
——————- subcarbonatis		——— subcarbonatis	½ fl. dr. to 1½ fl. dr.
		Liquor volatilis cornu cervini	½ fl. dr. to 1½ fl. dr.
		Litmus	
		Lythrum salicaria; herba	1 scr. to 1 dr.
Lytta	Cantharis vesicatoria	Cantharis	
Magnesia	Magnesia	Magnesia usta	½ dr. to 1 dr.
Magnesiæ carbonas	Magnesiæ carbonas	Magnesia	½ dr. to 2 drs.
——— sulphas	——— sulphas	Magnesiæ sulphas	1 dr. to 1 oz.
Malva	Malvæ sylvestris herba, flores		½ dr. to 1 dr.
		Majorana; herba	1 dr. to 2 drs.
Manna	Manna	Manna	4 drs. to 2 oz.
		Manganesium	
Marrubium	Marrubii vulgaris herba	Marrubium album; folia	1 scr. to 1 dr.
		Marum syriacum; herba	
Mastiche	Pistaciæ lentisci resina		10 grs. to ½ dr.
Mel	Mel	Mel	1 dr. to 4 drs.
—- boracis	—- boratis sodæ		1 dr. to 2 drs.
—- despumatum	—- despumatum		1 dr. to 4 drs.
—- rosæ	—- rosæ gallicæ	—- rosæ	
	Melissæ officinalis folia		1 dr. to 4 drs.
Mentha piperita	Menthæ piperitæ herba	Mentha piperitis	10 grs. to 1 dr.
——— viridis	——— pulegii herba	——— sativa; folium	10 grs. to 1 dr.
Menyanthes	Menyanthidis trifoliatæ folia	Trifolium paludosum	½ dr. to 1 dr.
Mezerei cortex	Daphne mezerei cortex	Mezereum; radicis cortex	1 gr. to 10 grs.
		Millepedæ	
Mistura ammoniaci		Lac ammoniaci	4 fl. drs. to 1 fl. oz.
——— amygdalarum	Emulsio amygdalæ communis	—- amygdalæ	1 fl. oz. to ½ pint.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Mistura assafœtidæ		Lac assafœtidæ	½ fl. oz. 1 fl. oz.
——— camphoræ	Emulsio camphoræ	Mistura camphorata	½ fl. oz. to 2 fl. oz.
——— cretæ	Portio carbonatis calcis	——— cretæ	1 fl. oz. to 2 fl. oz.
——— ferri composita			1 fl. oz. to 2 fl. oz.
——— guaiaci			½ fl. oz. to 2 fl. oz.
——— moschi			½ fl. oz. to 2 fl. oz.
Mori baccæ			
Moschus	Moschus	Moschus	2 grs. to 1 scr.
Mucilago acaciæ	Mucilago acaciæ Arabicæ	Muscilago gummi arabici	1 fl. oz. to 2 fl. oz.
	——— astragali tragacanthæ	——— gummi tragacanthæ	1. fl. oz. to 2 fl. oz.
——— amyli	——— amyli	——— amyli	1 fl. oz. to 2 fl. oz.
	Murias ammoniæ et ferri		
	——— barytæ		
		Murias sodæ siccatum	
Myristicæ nuclei	Myristicæ muschatæ fructus nucleus	Nux moschata	5 grs. to 1 scr.
Myrrha	Myrrha	Myrrha; gummi resina	10 grs. to 1 dr.
Oleum æthereum			
——— amygdalæ	Oleum amygdalæ communis	Oleum amygdalarum	4 fl. drs. to 1 fl. oz.
——— anisi	——— pimpineliæ anisi	——— seminum anisi	1 min. to 10 mins.
——— anthemidis	——— anthemidis nobilis		
——— carui		——— seminum carui	
		——— cornu cervi rectificatum	
		——— sem. fœniculi dulcis	
——— juniperi	——— juniperi communis		
——— lavandulæ	——— lavandulæ spicæ	——— florum lavandulæ	
	——— lauri sassafras	——— corticis et ligni sassafras	
——— lini	——— lini usitatissimi	——— lini	½ fl. oz. to 1 fl. oz.
——— menthæ piperitæ	——— menthæ piperitæ	——— menthæ piperitidis	1min. to 10 mins.
——— menthæ viridis		——— ——— sativæ	1 min. to 10 mins.
——— origani		——— origani	
——— pimentæ	Oleum myrti pimentæ	——— baccarum pimentæ	
——— pulegii		——— pulegii	
——— ricini			2 fl. drs. to 1 fl. oz.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Oleum rosmarini	Oleum rosmarini officinalis	Oleum rorismarini	2 mins. to 5 mins.
		——— rutæ	2 mins. to 5 mins.
	——— sabinæ	——— foliorum sabinæ	10 mins. to 1 fl. dr.
——— succini	——— succini purissimum	——— succini rectificatum	
——— sulphuratum	——— sulphuratum	——— sulphuratum	
——— terebinthinæ rectificatum	——— pini purissimum	——— terebinthinæ rectificatum	
Olibanum	Juniperis lycia; gummi resina	Olibanum; gummi resina	10 grs. to ½ dr.
Olivæ oleum	Oleæ europeæ; oleum fixum	Oleum olivarum	4 fl. drs. to 1. fl. oz.
Opium	Opium	Opium; succus concretus	½ gr. to 5 grs.
		——— purificatum	½ gr. to 5 grs.
Opoponacis gummi resina			10 grs. to ½ dr.
Origanum		Origanum; folia	5 grs. to 1 scr.
Ovum	Origani marjoranæ herba	Marjorana; herba	5 grs. to 1 scr.
	Oxidum ferri rubrum	Oxidum ferri rubrum	3 grs. to 15 grs.
	——— zinci impurum	Tutia	
Oxymel simplex		Oxymel	1 fl. dr. to 1 oz.
		——— colchici	½ fl. dr. to 2 fl. drs.
——— scillæ		——— scillæ	½ fl. dr. to 2 fl. drs.
Papaveris capsulæ	Papaveris somniferi capsulæ	Papaver album; capsulæ	
Petroleum	Bitumen petroleum	Petroleum barbadense	10 mins. to ½ fl. dr.
	Phosphas sodæ	Phosphas sodæ	6 drs. to 2 oz.
	Pilulæ aloeticæ		10 grs. to 1 scr.
Pilulæ alöes compositæ			10 grs. to 1 scr.
		Pilulæ aloes e zingibere	10 grs. to 1 scr.
——— cum myrrha	——— aloes et myrrha	——— aloes cum myrrha	10 grs. to 1 scr.
	——— aloes et assafœtidæ		10 grs. to 1 scr.
	——— assafœtidæ compositæ	——— myrrhæ compositæ	10 grs. to 1 scr.
	——— colocinthidis compositæ		10 grs. to 1 scr.
——— galbani compositæ			10 grs. to ½ dr.
——— cambogiæ compositæ	——— gambogiæ compositæ		5 grs. to 1 scr.
——— ferri cum myrrha	——— sulphatis ferri comp.		10 grs. to 1 scr.
——— hydrargyri	——— hydrargyri	——— hydrargyri	5 grs to 1 scr.
——— ——— submurias comp.	——— submur. hydrarg. comp.		5 grs. to 10 grs.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
	Pilulæ rhei compositæ		10 grs. to ½ dr.
Pilulæ saponis cum opio	——— opiatæ	Pilulæ è styrace	3 grs. to 10 grs.
——— scillæ compositæ	——— scilliticæ	——- scillæ cum zingibere	10 grs. to 1 scr.
Pimentæ baccæ	Myrti pimentæ fructus	Pimentæ baccæ	5 grs. to 1 scr.
Piperis longi fructus	Piperis longi fructus	Piperis longi fructus	5 grs. to 1 scr.
Piperis nigri baccæ	Piperis nigri fructus	Piper nigrum ; baccæ semen	5 grs. to 1 scr.
Pix arida	Pini abietis ; resina sponte concreta	Pix burgundica	
—- liquida	Pix liquida	—- liquida	
Plumbi subcarbonas	Carbonas plumbi	Cerussa	
——— oxydum semivitreum	———- plumbi semivitreum	Lythargyrum	
——— superacetas	Acetas plumbi	Acetas plumbi	½ gr. to 2 grs.
Porri, radix			1 fl. dr. to 4 drs.
Potassa impura	Carbonas potassæ impura	Cineres clavellati	
——— fusa	Potassa	Kali causticum	
——— cum calce	——— cum calce	——————— cum calce	
Potassæ acetas	Acetas potassæ	Acetas kali	1 scr. to ½ dr.
——— carbonas			10 grs. to ½ dr.
——— nitras	Nitras potassæ	Nitrum	10 grs. to ½ dr.
——— subcarbonas	Subcarbonas potassæ	Subcarbonas kali	10 grs. to ½ dr.
——— sulphas	Sulphas potassæ	Sulphas kali	1 dr. to ½ oz.
——— sulphuretum	Sulphuretum potassæ	Sulphuretum kali	5 grs. to 15 grs.
——— supersulphas			1 scr. to 2 drs.
——— supertartras	Supertartras potassæ	Tartarum crystalli	1 dr. to 1 oz.
——— tartras	Tartras potassæ	Tartaras kali	1 dr. to 1 oz.
Pruna	Pruni domesticæ fructus	Prunus gallica ; fructus	
Pterocarpi lignum	Pterocarpi santali lignum	Santalum rubrum ; lignum	
Pulegium	Menthæ pulegii herba	Pulegium ; herba	10 grs. to 1 dr.
	Pulvis aluminis compositus		10 grs. to 1 dr.
		Pulvis aloes cum canella	10 grs. to 1 scr.
Pulvis aloes compositus		——- aloes cum guaico	10 grs. to 1 scr.
——- antimonialis	Pulvis antimonialis	——- antimonialis	5 grs. to 10 grs.
——- cinnamomi comp.	—— aromaticus	——- aromaticus	5 grs. to 10 grs.
	—— asari compositus	——- asari compositus	

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Pulvis contrayervæ compositus			15 grs. to ½ dr.
		Pulvis cornu cervini usti	1 scr. to 1 dr.
—— cornu usti cum opio	Pulvis opiatus		5 grs. to 1. scr.
—— cretæ compositus	—— carbonatis calcis comp.		½ dr. to 1 dr.
—————— c. opio			1 scr. to 2 scrs.
	—— jalapæ compositus		15 grs. to 1 scr.
—— ipecacuanhæ compositus	—— ipecacuanhæ et opii	—— ipecacuanhæ compositus	5 grs. to 1 scr.
—— kino compositus			15 grs. to 1 scr.
—— scammoneæ compositus	—— scammonii compositus		10 grs. to 1 scr.
	—— salinus compositus	—— quercus marinæ	10 grs. to 2 scrs.
—— sennæ compositus			1 scr. to 1 dr.
		—— scillæ	3 grs. to 6 grs.
		—— spongiæ ustæ	1 scr. to 1 dr.
		—— stanni	1 dr. to 4 drs.
—— tragacanthæ compositus			10 grs. to 1 dr.
Pyrethri radix	Anthemidis pyrethri radix	Pyrethri radix	3 grs. to 10 grs.
Quassiæ lignum	Quassiæ excelsæ lignum	Quassiæ lignum	5 grs. to ½ dr.
Quercus cortex	Quercus roboris cortex	Quercus cortex	10 grs. to ½ dr.
Resina flava, nigra			
Rhamni baccæ	Rhamni cathartici succus		1 dr. to 2 drs.
Rhei radix	Rhei radix	Rheum ; rheum undulatum ; radix	10 grs. to ½ dr.
Rhœadas petala		Papaver erraticum ; petala	
	Rhododendri chrysanthi folia		5 grs. to 10 grs.
Ricini semina et oleum	Ricini semina et oleum fixum	Ricini oleum e sem. expressum	4 fl. dr. to 1 fl. oz.
Rosæ caninæ pulpa	Rosæ caninæ fructus		1 scr. to 1 dr.
—— centifoliæ petala	Rosæ centifoliæ petala	Rosæ damascenæ petala	1 scr. to 1 dr.
—— gallicæ petala	—— gallicæ petala	—— rubræ petala	1 scr. to 1 dr.
Rosmarini cacumina	Rosmarini officinalis cacumina	Rosmarina ; herba	10 grs. to ½ dr.
Rubiæ radix	Rubiæ tinctorum radix	Rubiæ radix	½ dr. to 1 dr.
Rutæ folia	Rutæ graveolentis herba	Rutæ folia	15 grs. to 2 scrs.
Sabinæ folia	Juniperi sabinæ folia	Sabinæ folia	10 grs. to ½ dr.
Saccharum	Saccharum non purificatum	Saccharum rubrum	
—— purificatum	—— purissimum	—— purificatum	

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Sagapenum	Segapenum	Segapenum gummi resina	10 grs. to ½ dr.
Salicis cortex		Salix ; fragilis ; cortex	10 grs. to ½ dr.
	Salviæ officinalis folia	Salvia	15 grs. to 1 scr.
Sambuci flores	Sambuci nigræ flores baccæ cortex	Sambucus nigra ; flos, baccæ, cortex	5 grs. to 1 scr.
Sapo durus	Sapo durus	Sapo durus hispanicus	5 grs. to ½ dr.
—— mollis	—— mollis		
Sarsaparillæ radix	Smilacis sarsaparillæ radix	Sarsaparillæ radix	1 scr. to 1 dr.
Sassafras lignum et radix	Lauri sassafras lignum, radix	Sassafras lignum et radix	1 scr. to 1 dr.
Scammoniæ gummi resina	Convolvuli scammoniæ gummi resina	Scammonium ; gummi resina	5 grs. to 1 scr.
Scillæ radix	Scillæ maritimæ radix	Scillæ radix	1 gr. to 3 grs.
		Scrophularia ; herba	
Senegæ radix	Polygalæ senegæ radix		1 scr. to 2 scrs.
Sennæ folia	Cassiæ sennæ folia	Sennæ folia	1 scr. to 1 dr.
Serpentariæ radix	Aristolochiæ serpentariæ radix	Serpentaria virginiana ; radix	10 grs. to ½ dr.
Sevum	Adeps, vulgo sevum ovillum	Sevum ovillum	
—— preparatum			
Simaroubæ cortex	Quassiæ simaroubæ cortex	Simarouba ; cortex, lignum	10 grs. to ½ dr.
Sinapis semina	Sinapis albæ semina	Sinapis alba ; semen	1 scr. to ½ dr.
		Sium ; herba	*of the juice*, 2. fl. oz.
Soda impura	Subcarbonas sodæ impurus	Barilla	
Sodæ subcarbonas	Subcarbonas sodæ	Carbonas sodæ	10 grs. to ½ dr.
———— exsiccata		———— siccatum	5 grs. to 15 grs.
—— sulphas			10 grs. to ½ dr.
—— sub-boras	Sub-boras sodæ	Sub-boras sodæ	10 grs. to ½ dr.
—— murias	Murias sodæ	Sal commune	1 scr. to 1 dr.
—— sulphas	Sulphas sodæ	Sulphas sodæ	1 dr. to 1 oz.
Soda tartarizata	Tartras sodæ et potassæ	Tartaras sodæ et kali	1 dr. to 1 oz.
	Solutio acetatis zinci		5 mins. to 10 mins.
	—— muriatis barytæ		10 mins. to 1 fl. dr.
	—— muriatis calcis	Aqua muriatis calcis	
	—— sulphatis cupri composita		
	—— sulphatis zinci		1 ſcr. to 1 dr.
Spartii cacumina	Spartii scoparii ſummitates	Genista ; semina, cacumina	

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Spigeliæ radix	Spigeliæ marilandicæ radix	Spigelii radix	10 grs. to 2 scr.
Spiritus ætheris compositus			½ fl. dr. to 1 fl. dr.
——— nitrici	Spiritus ætheris nitrosi	Spiritus æthereus nitrosus	
——— sulphurici	Æther sulphuricus cum alcohole	Liquor æthereus sulphuricus	
——— ammoniæ	Alcohol ammoniatum	Spiritus ammoniæ	
——— aromaticus	——— aromaticum	——— aromaticus	
——— fœtidus	——— fœtidum	——— fœtidus	
——— succinatus			
——— anisi		——— anisi compositus	10 mins. to 1 fl. dr.
——— armoraciæ comp.		——— raphani compositus	½ fl. dr. to ½. fl. oz.
——— camphoræ	Tinctura camphoræ		1 fl. dr. to 4 fl. drs.
——— carui	Spiritus cari carui	——— carui	1 fl. dr. to ½ fl. oz.
——— cinnamomi	——— lauri cinnamomi	——— cinnamomi	
——— juniperi compositus	——— juniperi compositus	——— juniperi compositus	
——— lavandulæ	——— lavandulæ spicæ	——— lavandulæ	
——— lavandulæ compositus	——— lavandulæ compositus	——— lavandulæ compositus	
——— menthæ piperitæ	——— menthæ piperitæ	——— menthæ piperitæ	
——— menthæ viridis			
——— myristicæ	——— myristicæ moschatæ	——— nucis moschatæ	
——— pimentæ	——— myrti pimentæ	——— pimento.	
——— pulegii			
——— rectificatus		——— vinosus rectificatus	1 fl. dr. to ½ fl. oz.
——— tenuior	Alcohol dilutum	——— vinosus tenuior	
——— rosmarini	Spiritus rosmarini officinalis	——— rosmarini	
Spongia	Spongia officinalis	Spongia	
——— usta		Pulvis spongiæ usta	1 dr. to ½ fl. oz.
Stannum	Stanni limatura	Stanni pulvis	1 dr. to 4 drs.
Staphisagriæ semina	Delphinii staphisagriæ semina	Staphisagriæ semina	3 grs. to 10 grs.
Styracis balsamum	Styracis officinalis balsamum	Styrax calamita; resina	10 grs. to ½ dr.
		——— purificata	10 grs. to ½ dr.
	Subsulphas hydrargyri flavus		1 gr. to 5 grs.
Succinum	Succinum	Succinum	½ dr. to 1 dr.
	Succus spissatus sambuci nigræ	Succus spissatus sambuci	½ dr. to 1½ oz.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
	Sulphas barytæ		
	—— potassæ cum sulphure		15 grs. to 1 dr.
Sulphur sublimatum	Sulphur sublimatum	Sulphur sublimatum	½ dr. to 2 drs.
—— lotum	—— lotum	—— lotum	½ dr. to 2 drs.
—— præcipitatum			½ dr. to 2 drs.
	Sulphuretum hydrargyri nigrum		1 scr. to 1 dr.
		Swietenia febrifuga ; cortex	1 scr. to 2 scr.
Syrupus simplex	Syrupus simplex	Syrupus	
	—— aceti		
		—— alii	
—— altheæ	—— altheæ officinalis		
—— aurantiorum	—— citri aurantii	—— aurantii	
	—— colchici autumnalis		
—— croci			1 fl. dr. to 2 fl. drs.
	—— dianthi caryophylli	—— caryophylli rubri	
—— limonum	—— citri medicæ	—— limonis	
—— mori			
		—— opii	
—— papaveris	—— papaveris somniferi	—— papaveris	
—— rhœados		—— papaveris erratici	
—— rhamni			
—— rosæ	—— rosæ centifoliæ		
	—— rosæ gallicæ		
—— sennæ		—— sennæ	1 fl. dr. to 2 fl. drs.
	—— scillæ maritimæ		
—— tolutanus	—— toluiferæ balsami		
	—— violæ odoratæ	—— violæ	
—— zingiberis	—— amomi zingiberis	—— zingiberis	
Tabaci folia	Nicotianæ tabaci ; folia	Nicotianæ folia	½ gr. to 5 grs.
Tamarindi pulpa	Tamarindi indicæ fructus	Tamarindus fructus	1 dr. to 1 oz.
	Tanaceti vulgaris folia	Tanacetum ; folia	½ dr. to 1 dr.
Taraxici radix	Leontodi taraxici herba, radix	Taraxicum ; radix, folia	½ dr. to 1 dr.
Tartarum			

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Terbinthina canadensis		Balsamum canadense	1 scr. to 1 dr.
——— chia			
	Resina liquida, vulgo, balsamum veneta	Terebinthina veneta	
——— vulgaris, oleum	Pini oleum volatile	——— vulgaris; resina	
Testæ præparatæ			½ dr. to 2 drs.
		Tinctura acetatis ferri	10 mins. to 1 fl. dr.
		——— cum alcohole	10 mins. to 1 fl. dr.
Tinctura alöes	Tinctura alöes socotorinæ	——— alöes socotorinæ	½ fl. dr. to 1 fl. oz.
	——— alöes æthereæ		½ fl. dr. to 1½ fl. dr.
——— alöes composita	——— alöes et myrrhæ	——— alöes composita	½ fl. dr. to 2 fl. drs.
		——— angusturæ	½ fl. dr. to 2 fl. drs.
——— assafœtidæ	——— ammoniata assafœtidæ	——— assafœtidæ	½ fl. dr. to 2 fl. drs.
——— aurantii		——— aurantii	½ fl. dr. to ½ fl. oz.
——— benzoini composita	——— benzoini composita	——— benzoes composita	½ fl. dr. to 2 fl. drs.
——— calumbæ	——— columbæ	——— colombo	½ fl. dr. to ½ fl. oz.
——— camphoræ composita	——— opii camphorata	——— opii camphorata	½ fl. dr. to ½ fl. oz.
——— capsici			½ fl. dr. to 2 fl. drs.
——— cardamomi	——— ammomi repentis	——— cardamomi	1 fl. dr. to 2 fl. drs.
——— ——— composita		——— ——— composita	½ fl. dr. to 2 fl. drs.
——— cascarillæ	——— crotonis eleutheriæ	——— cascarillæ	½ fl. dr. to ½ fl. oz.
——— castorei	——— castorei	——— castorei rossici canadensis	½ fl. dr. to ½ fl. oz.
	——— ——— composita		½ fl. dr. to 2 fl. drs.
——— catechu	——— acaciæ catechu	——— catechu	½ fl. dr. to ½ fl. oz.
——— cinchonæ	——— cinchonæ lancifoliæ	——— cinchonæ	1 fl. dr. to ½ fl. oz.
——— ——— composita	——— ——— composita	——— ——— composita	
——— cinnamomi	——— cinnamomi	——— cinnamomi	½ fl. dr. to 3 fl. drs.
——— ——— composita	——— cinnamomi composita	——— ——— composita	
	——— croci sativæ	——— croci	1 fl. dr. to 3 fl. drs.
——— digitalis	——— digitalis purpureæ	——— digitalis	10 mins. to 40 mins.
——— ferri ammoniati			½ fl. dr. to 2 fl. drs.
——— ferri muriatis	——— muriatis ferri	——— muriatis ferri	10 mins. to ½ fl. dr.
		——— galbani	1 fl. dr. to 3 fl. drs.
		——— gallarum	½ fl. dr. to 3 fl. drs.

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Tinctura gentianæ composita	Tinctura gentianæ composita	Tinctura gentianæ composita	1 fl. dr. to 2 fl. drs.
—— guiaci	—— guaici officinalis	—— guaicaci	
—— —— ammoniata	—— —— ammoniata	—— —— ammoniata	
—— hellebori nigri	—— hellebori nigri	—— hellebori nigri	½ fl. dr. to 1 fl. dr.
—— humuli	—— humuli lupuli		½ fl. dr. to 2 fl. drs.
—— hyosciami	—— hyosciami nigri	—— hyosciami	10 mins. to 1 fl. dr.
—— jalapæ	—— convolvuli jalapæ	—— jalapæ	1 fl. dr. to 4 fl. drs.
—— kino	—— kino	—— kino	½ fl. dr. to 2 fl. drs.
—— lyttæ	—— cantharidis vesicatoriæ	—— cantharidis	10 min. to 2 fl. drs.
		—— moschi	½ fl. dr. to ½ fl. oz.
—— myrrhæ	—— myrrhæ	—— myrrhæ	½ fl. dr. to 1 fl. dr.
		—— muriatis ferri cum oxido rubro	10 mins. to 1 fl. dr.
—— opii	—— opii, sive thebaica	—— opii, sive thebaica	10 mins. to ½ fl. dr.
	—— opii ammoniata		½ fl. dr. to 3 fl. drs.
		—— quassiæ	½ fl. dr. to 2 fl. drs.
—— rhei	—— rhei	—— rhei	2 fl. drs. to 1 fl. oz.
—— rhei composita			
	—— rhei et alöes		
	—— rhei et gentianæ		
	—— saponis et opio		1 fl. dr. to 6 fl. drs.
—— scillæ	—— scillæ maritimæ	—— scillæ	10 mins. to 1 fl. dr.
—— sennæ	—— sennæ commposita	—— sennæ	2 fl. drs. to 1 fl. oz.
—— serpentariæ		—— serpentariæ	½ fl. dr. to 2 fl. drs.
—— valerianæ	—— toluiferæ balsami		½ fl. dr. to 1 fl. dr.
—— —— ammoniata	—— valerianæ ammoniata	—— valerianæ	
	—— veratri albi		5 mins. to 10 mins.
—— zingiberis		—— gingiberis	½ fl. dr. to 2 fl. drs.
Tormentillæ radix	Tormentillæ erectæ, radix	Tormentillæ radix	10 grs. to ½ dr.
Toxicodendri folia	Floris toxicodendri folia		2 grs. to 15 grs.
Tragacantha	Astragali tragacanthæ gummi	Gummi tragacantha	10 grs. to 1 dr.
	Trochisci carbonatis calcis		
	—— glycyrrhizæ glabræ		

London.	*Edinburgh.*	*Dublin.*	*Doses.*
	Trochisci —— cum opio		
	—— magnesiæ		
	—— gummosi		1 or 2 *occasionally.*
	—— nitratis potassæ		
Tussilago	Tussilaginis farfaræ folia flores	Tussilago	½ dr. to 1 dr.
Ulmi cortex	Ulmi campestris cortex	Ulmi cortex	1 scr. to 1 dr.
	Unguentum acidi nitrosi	Unguentum acidi nitrosi	
	—— acetatis plumbi		
	—— gallæ		
		—— ceræ albæ	
		—— ceræ flavæ	
Unguentum cetacei		—— spermatis ceti	
—— elemi compositum		—— elemi	
—— hydrargyri fortius	—— hydrargyri	—— hydrargyri	
—— hydrargyri mitius		—— hydrargyri mitius.	
	—— oxidi hydrargyri cinerei		
—— hydrargyri nitratis	—— nitratis hydrargyri fortius	—— supernitratis hydrargyri	
	—— —— mitius		
—— hydrargyri nitrico-oxidi	—— oxidi hydrargyri rubri	—— subnitratis hydrargyri	
—— hydrargyri præcip. albi		—— submuriatis hydrarg. ammon.	
	—— infusi cantharidis vesicatorieæ		
	—— carbonatis plumbi	—— cerussæ	
	—— oxidi zinci impuri	—— tutiæ	
—— picis aridæ			
—— picis liquidæ	—— picis liquidæ	—— picis liquidæ	
		—— piperis nigri	
	—— pulveris cantharidis vesicatorii	—— cantharidis	
—— sambuci		—— sambuci	
	—— simplex		
	—— subacetatis cupri	—— æruginis	
—— sulphuris	—— sulphuris	—— sulphuris	
—— sulphuris compositum			

London.	*Edinburgh.*	*Dublin.*	*Doses.*
Unguentum veratri		Unguentum hellebori albi	
—— zinci	Unguentum oxidi zinci	—— oxidi zinci	
Uvæ passæ	Uvæ passæ	Uvæ passæ sole siccatæ	
—— ursi folia	Arbutus uvæ ursi; folia	—— ursi folia	10 grs. to 1 dr.
Valerianæ radix	Valerianæ officinalis radix	Valerianæ radix	1 scr. to 2 scrs.
Veratri radix	Veratri albi radix	Helleborus albus; radix	2 grs. to 5 grs.
Vinum	Vinum album hispanicum		
—— alöes	—— alöes socotorinæ	Vinum aloes	½ fl. oz. to 1 fl. oz.
	—— gentianæ compositum		½ fl. oz. to 1 fl. oz.
—— ferri		—— ferri	1 fl. dr. to ½ fl. oz.
—— ipecacuanhæ	—— ipecacuanhæ	—— ipecacuanhæ	20 mins. to 40 *sudor.* 2 fl.drs. to 1 fl.oz. *emet.*
	—— nicotianæ tabaci		30 mins. to 70 mins.
—— opii	—— opii		10 mins. to 1 fl. dr.
	—— rhei		4 fl. drs. to 1 fl. oz.
	Violæ odoratæ flores	Violæ flores	
		Virga aurea; flores, folia	10 grs. to 1 dr.
	Winteræ aromaticæ cortex		10 grs. to 1 scr.
		Zedoaria; radix	1 scr. to 1 dr.
Zincum	Zincum	Zincum	
Zinci oxydum	Ozidum zinci	Oxidum zinci	3 grs. to 10 grs.
—— sulphas	Sulphas zinci	Sulphas zinci	1 gr. to 5 grs.
Zingiberis radix	Amomi zingiberis radix	Zingiber	5 grs. to ½ dr.

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EXPLANATION OF THE PLATES.

PLATE 1.

Fig. 1. An iron or brass mortar placed on a stand.

2, 3. Marble and Wedgewood's ware mortars, with their respective pestles.

4. A levigating stone and muller, consisting of *a a*, the muller, which is generally made of porphyry; and *b*, the table or slab, of the same substance, highly polished.

5. A compound sieve, consisting of *b*, the lid; *c*, the body of the sieve; and *d*, the receiver.

6. A rasp.

7. A perforated support for phials, and for funnels.

8. A graduated glass measure capable of holding four fluid ounces.

9. A graduated measure for one fluid ounce.

10. A minim measure open at both ends.

11. A ribbed glass funnel.

12. A compound syphon, placed in the situation in which it is used; *e*, a vessel containing the fluid which is to be drawn off into *i*, another vessel; *g*, the body of the syphon; *h*, the mouth-piece; *f*, the board for supporting the syphon in shallow vessels.

13. A separatory, for separating fluids of different specific gravity. The mixture is introduced through the central mouth, which is then to be corked. By inclining the bottle to one side, and at the same time stopping the orifice on the opposite side, the fluids will separate; and when the finger is removed, the heavier will run through the lower orifice or neck before any of the lighter escapes.

14. A separatory funnel, for separating essential oils from the water with which they come over in distillation.

PLATE 2.

Fig. 1. The common still fitted to a portable furnace. The still consists of two parts; *a*, the head or capital; *b*, the body, which is partly sunk in the furnace. From the top of the head rises the curved pipe, *c*, which enters the upper part of *d*, the serpentine or worm, placed in B, the refrigeratory.

2. A *Black's furnace* (*portable furnace*); *f*, an opening for admitting the fuel into the body of the furnace, and receiving the sand-bath *n*; (fig. 3.) *e*, the chimney, which may be lengthened by the addition of iron tubes: *g g g*, rings intended to support an upright iron wire, or pillar, which has a corresponding one on the opposite side of the furnace, and a cross strong wire being stretched between

them serves to suspend any vessel over the furnace: *h*, an earthen or iron tube, which passes through the body of the furnace, and issues at the opposite side, intended for procuring hydrogen gas; or into the hole on one side, if the opposite hole be shut, the muzzle of a pair of bellows may be inserted; *k*, an opening closely fitted with a sliding door for receiving a muffle; *l*, a sliding iron plate which may be made to cover any number of holes opening into the ash-pit, so as to regulate the draught of air; *m*, the door of the ash-pit.

Fig. 3. *n*, An *iron pot*, intended for a sand-bath; *p*, a cover for this pot, or for the opening into the body of the furnace when the pot is not used; *o*, a stopper, which fits accurately the perforation in the centre of *p*.

4, 5. Different kinds of *crucibles*; *a*, *a*, the lids; *b*, *b*, the bodies of the crucibles; *e*, *e*, the stands or supports.

PLATE 3.

Fig. 1. A Wedgewood's ware *evaporating dish*.

2, 3, 4, 5. Parts of a *water-bath*, for preparing extracts, invented by Dr. Powell. *a*, fig. 2. a common tin vessel, with *b*, a projecting spout, through which the steam may pass, and additions of water be made when necessary: *a*, fig. 3. upper concave surface of the cover, or evaporating pan, the edge of which projects over that of the vessel; *b*, its handle. Figs. 4, 5. Sections of two different evaporating pans, one much deeper than the other.

6. Mr. Paul's alcohol blow-pipe. *a*, A hollow frame of wood, five inches in its longest dimension, supporting the pillar, *d*, and the two lamps, *b*, *c*; the rim, *e*, slips upon the pillar *d*, as low as the shoulder of the latter will permit; but it may be raised or lowered at pleasure, and kept fast by the screw peg, *f*. The rim supports *g*, the boiler, which is a hollow piece of thick brass, which will hold about f℥j of alcohol, and has four openings; three, *h*, *i*, *k*, at the top, and one at the bottom, to receive the tube *o*. The latter is long enough to reach to the level of the outside of the boiler, and consequently the alcohol in the boiler cannot readily boil over into the tube; and the opening *k*, which corresponds with it, is closely shut by a screw stopper, hollowed out a little beneath, to allow the free passage of the vapour down the tube. By the contiguity of *o* to the lamp *b* the vapour is prevented from condensing, and as it passes on through the globe *q q*, into the jet tube *r*, it is directly kindled by the flame of the lamp *c*; and the united flames being violently propelled sideways, a long pencil of blue flame is formed, and remains as long as any alcohol is left in the boiler. The boiler is filled at the opening *h*. The central hole, *i*, is nicely fitted with a brass plug, kept down by a thin slip of iron, *l*, which is confined at one end between two flat screws, *m*, *n*, on the top of the upright pillar. This

acts as a safety-valve, to prevent the vessel from bursting when the vapour cannot escape quick enough at the jet-pipe *r*.

7. A precipitating jar.
8. An iron ring, for cutting glass vessels by means of heat.

PLATE 4.

Fig. 1. Fire-tongs.
2. A muffle.
3. A glass-retort.
4. A proof bottle, for extricating gases without heat.
5. A small matrass, with a twisted wire for holding it.
6. A ribbed glass funnel.
7. An apparatus for digestions.
8. A set of aludels.
9. *a*, A tubulated retort. *b*, An adopter, for extending the distance through which the volatilized matter must pass before it enters, *c*, the receiver.
10. A glass alembic and globe receiver. *a*, The head or capital covering; *b*, the cucurbit or boiler, the bottom of which is made thin, in order to bear a lamp heat: *c*, the receiver into which the beak of the capital enters.
11. A common flask.
12. A retort funnel.

PLATE 5.

Fig. 1. WOULFE'S APPARATUS, consisting of the following parts:—*a*, an iron or brass stand, with a sliding ring, for supporting the retort; *b*, a tubulated retort; *c*, a tubulated receiver, placed on a wooden tripod, *m*; *d*, Welter tube of safety; *f* the conducting tube; *h*, other conducting tubes; *e*, *g*, receivers; *k*, a pneumatic trough, containing *i*, an inverted jar; *l*, a small Argand's lamp.
2. *a*, *b*, *c*, *d*, A range of round receivers, which may be used in the same manner as Woulfe's apparatus; *e*, a safety tube.
3. A machine for dividing equally any mass intended to be rolled into pills.

PLATE 6.

STEAM LABORATORY AT APOTHECARIES' HALL.

Fig. 1. A copper boiler with a safety-valve, float-stone and other appurtenances of the steam-engine boiler.
2. The steam-pipe, which entering the laboratory, ramifies in every direction below the pavement of the laboratory. It is marked 2 throughout.
3. and 4. The boilers and stills which it supplies; they are of block-tin and copper, with an outer casing of cast-iron, there being a cavity between the two vessels, for the passage of the steam. *a a*, Worm-tubs belonging to the stills.

5. Cast-iron pipes, conveying the condensed water through the syphon into the hot water cistern 7, whence it is occasionally forced into the boiler by the process 8.
6. Small vessels constructed similarly to those marked 3, for distillation in glass retorts.
b. The chimney of the boiler which passes under the floor of the laboratory; *e e* valve boxes.

Fig. 2. Represents a section of the boiler: 1. the steam boiler; 2. the main steam pipe; *c*, the safety-valve; *d*, waste pipe; *k*, registers of the steam-cocks; 3. evaporating boilers; 5. the condensed water-pipe.

3. Section of the steam-boiler, shewing the connexion of the steam and condensing pipes, with four smaller evaporating pans.

4. *w* and *v*. Are top and side views of a valve-box, attached to the extremity of the main steam-pipe at *e*, fig. 1. in order to carry off any water produced by the condensation of the steam in the main without suffering steam to escape. 2. Termination of the steam main; *g*, the cork float, which when raised by water in the box, opens the cock, *h*, and suffering it to run off the float subsides and closes the cock; *i*, fig. 5. is a cock by which the air is suffered occasionally to escape from the steam-pipes.

Similar boxes are attached to several of the condensing pipes of the other vessels.

PLATE 7.

The annexed plate represents an elevation of one side of the STEAM LABORATORY; the ground plan of which was given in the last plate; the figures and letters of reference are the same as before.

2. The main steam-pipe.
3. An evaporating boiler.
4. The stills. 5. The condensed water-pipe. *k*, The steam cocks with their registers.
a, The worm tubs.
n, *n*. Pipes carrying off hot water from the surface of the worm tubs, the place of which is supplied by cold water entering below, from the back *l*.

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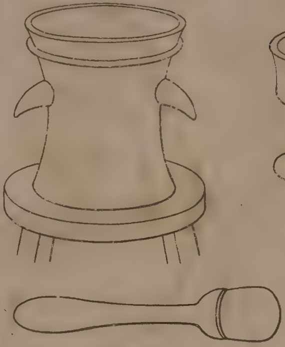
Plate 1.

Fig. 1.



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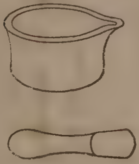

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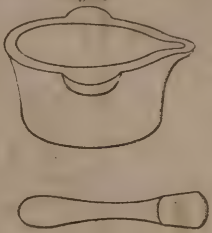

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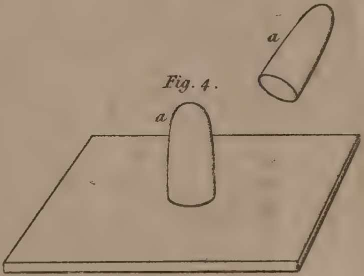

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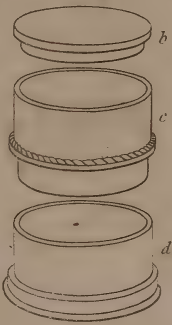

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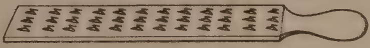

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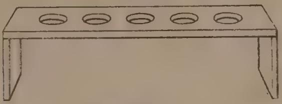

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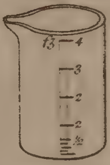

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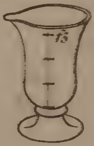

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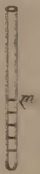

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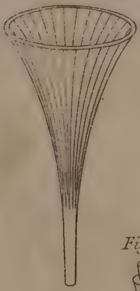

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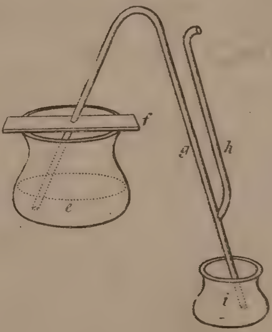

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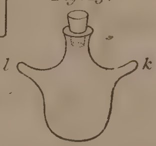

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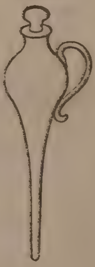

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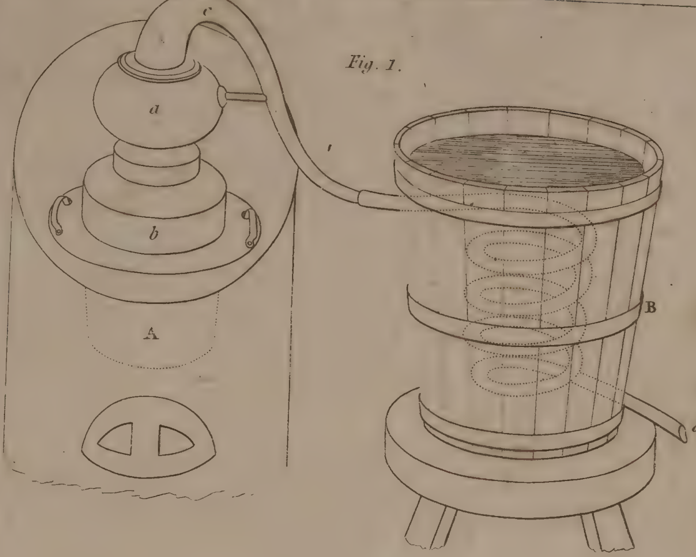

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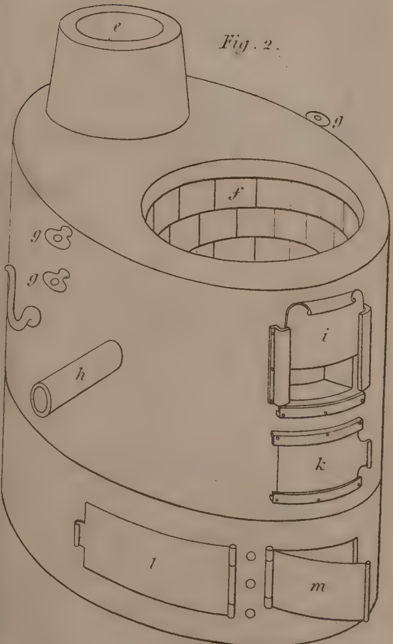

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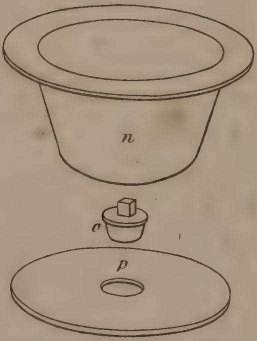

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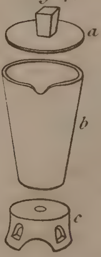

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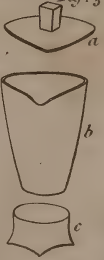

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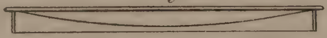

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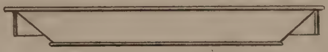

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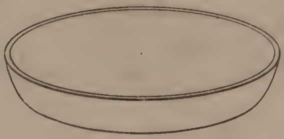

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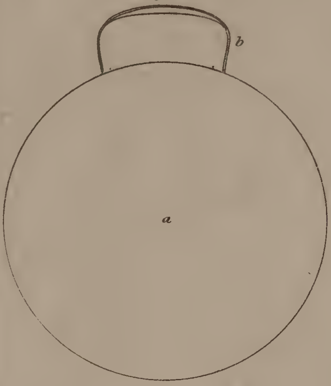

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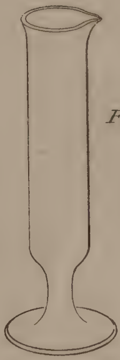

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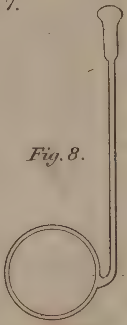

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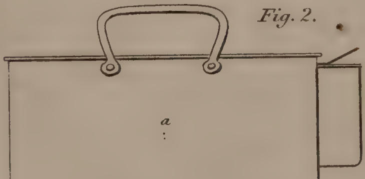

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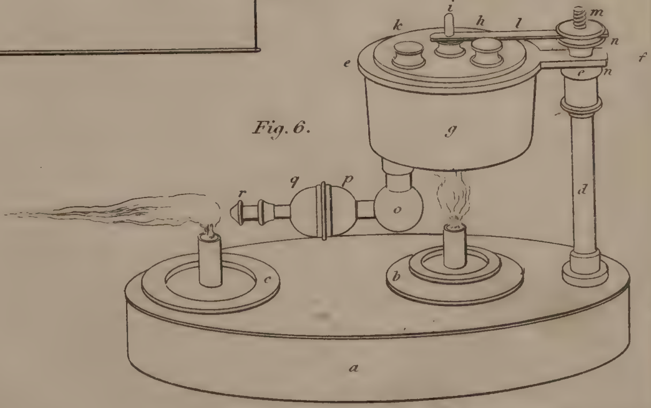

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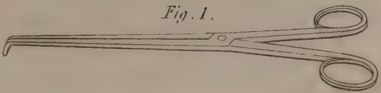

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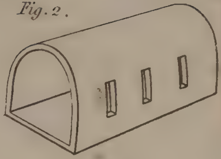

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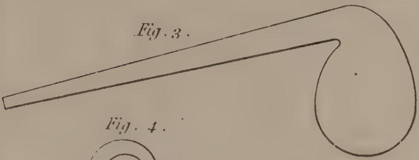

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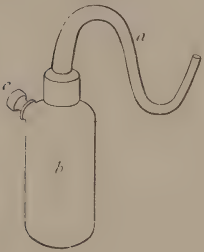

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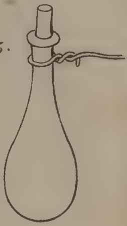

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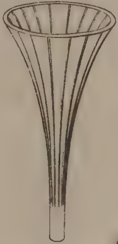

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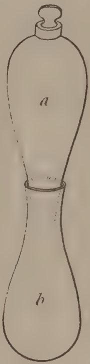

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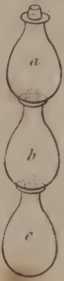

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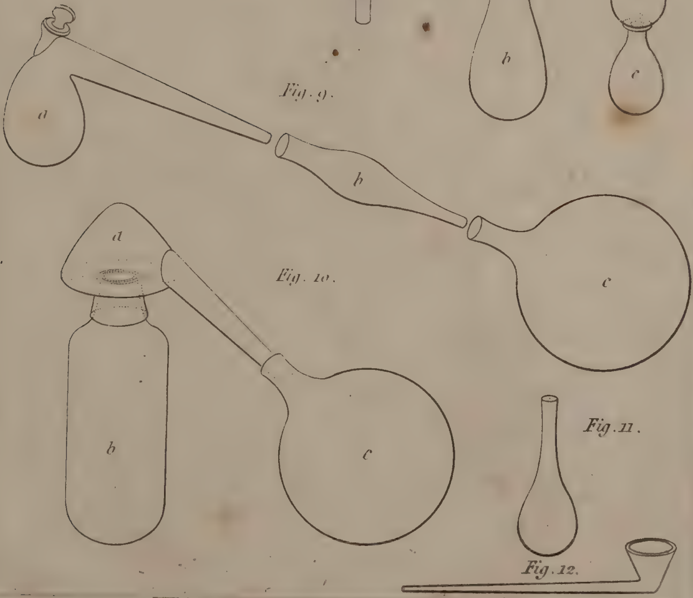


Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Lowry sculp.

Plate 5.

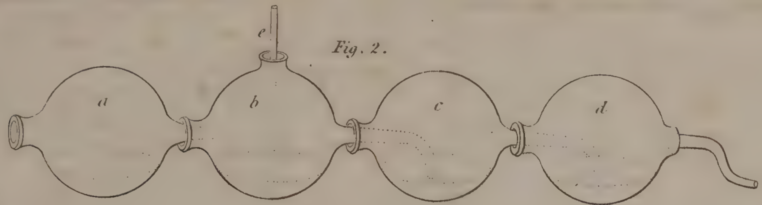


Fig. 2.

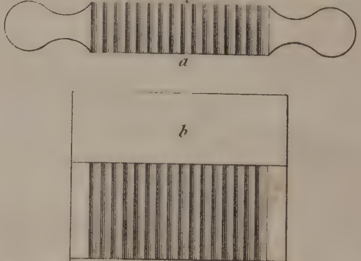


Fig. 3.

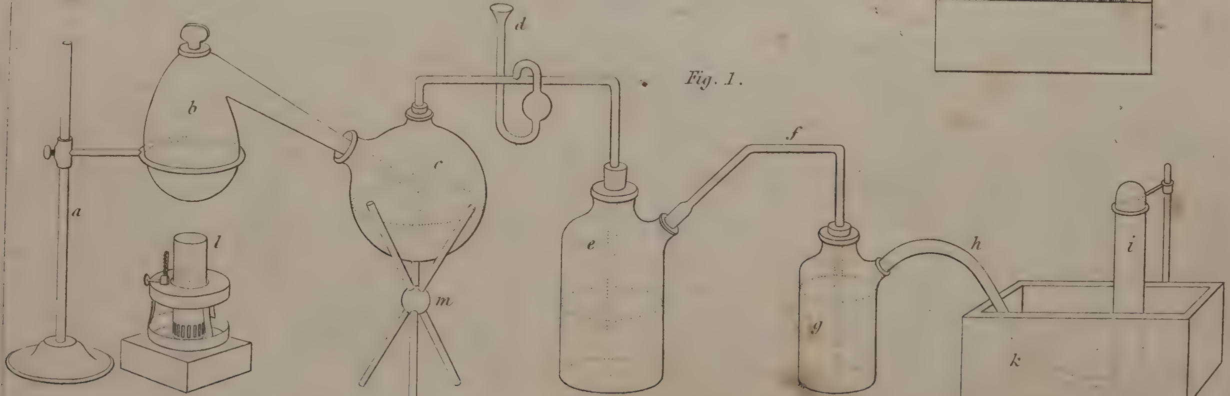
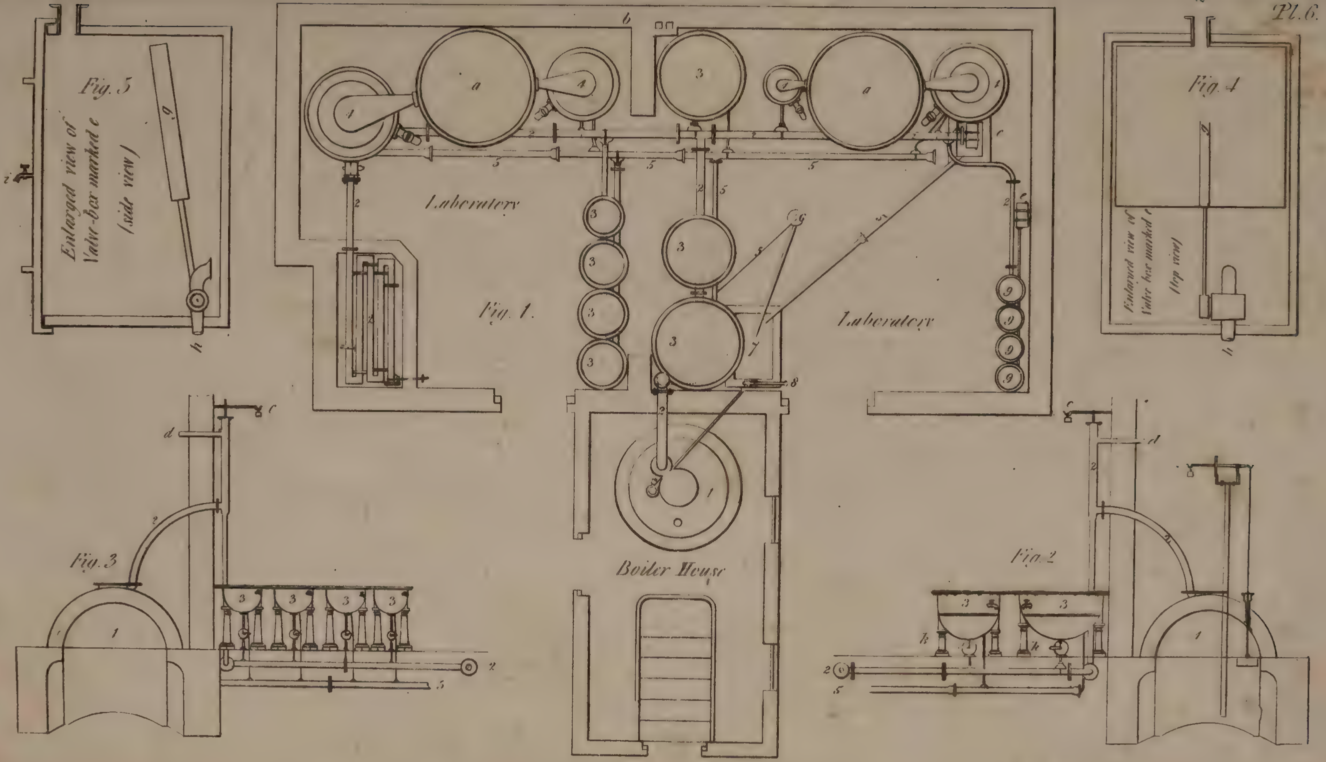


Fig. 1.

Lowry Sculp.

STEAM LABORATORY AT APOTHECARIES HALL.

Pl. 6.

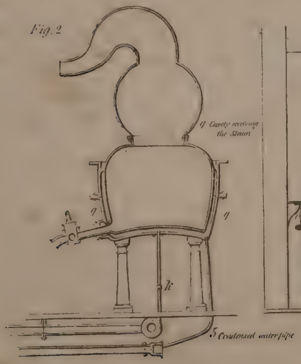


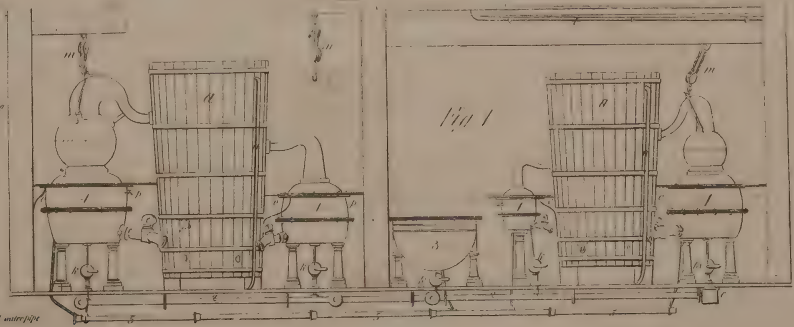
Hawkins Sculp.

STEAM LABORATORY AT APOTHECARIES HALL.

Enlarged section of a Still

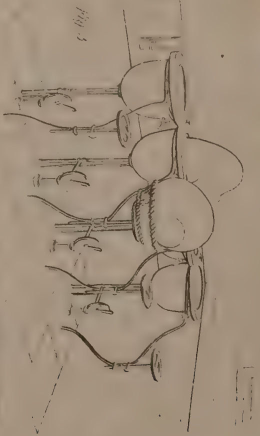
Fig. 2





Elevation of the east side of the Laboratory shewing four Stills and a Boiler; with their respective Steam Pipes &c.

Fig. 3



Perspective of the small vessels for distillation in glass retorts marked O on the ground Plan.

Hawkins Sculp